

THE MINING CONGRESS JOURNAL

APRIL, 1917

VOL. III

SAFETY—EFFICIENCY—CONSERVATION

No. 4

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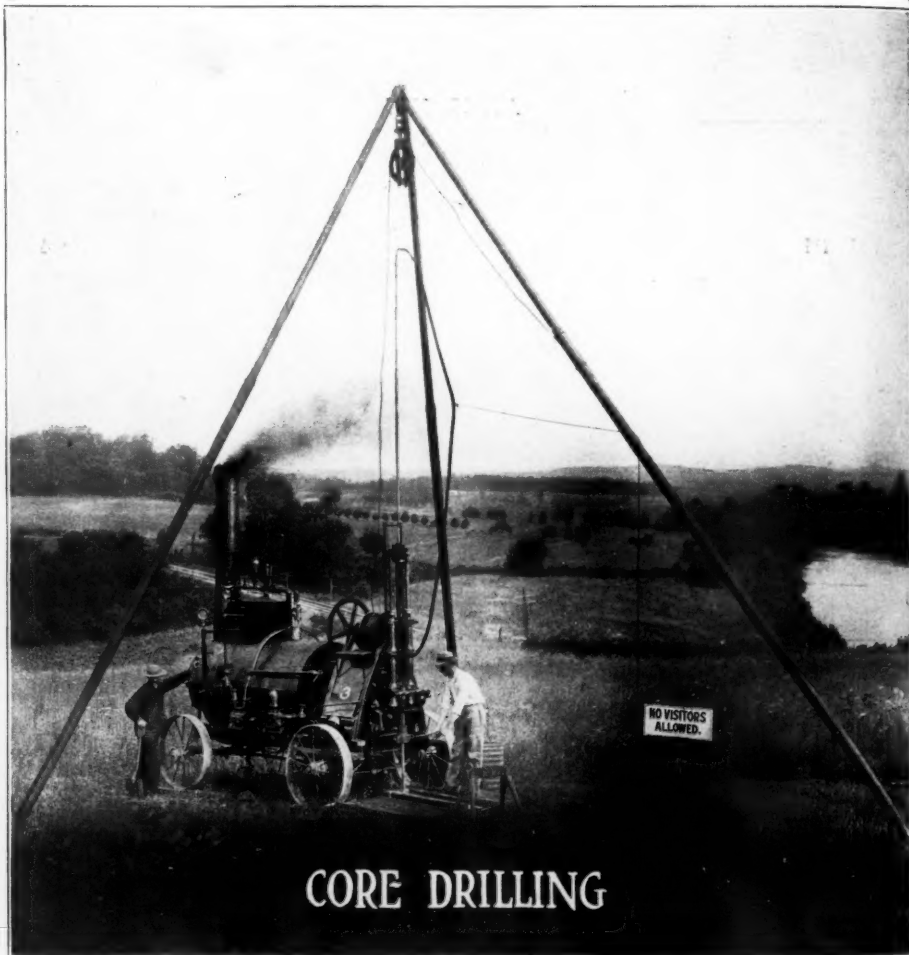
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MARCH

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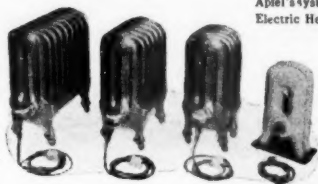
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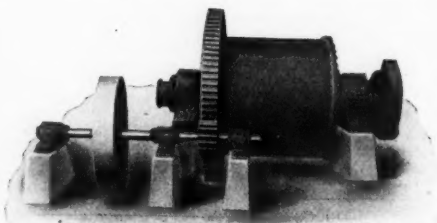
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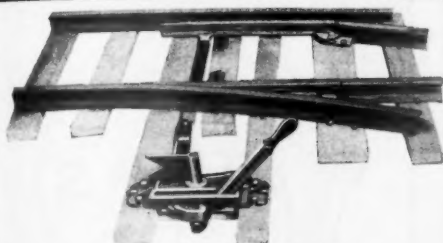
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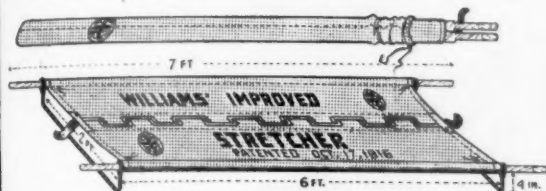
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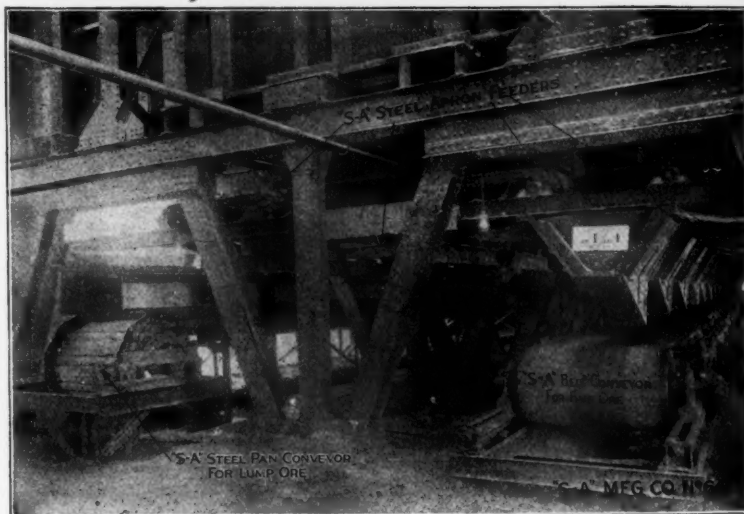
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The Mining Congress Journal,
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THE MINING CONGRESS JOURNAL

Official Organ of the American Mining Congress

THE COLORADO INDUSTRIAL DISPUTES INVESTIGATION ACT

References were made in the March issue of THE MINING CONGRESS JOURNAL to the comprehensive effort which was being made to bring about the repeal of the Colorado Industrial Commission Law providing for the compulsory investigation of industrial disputes. We are very much gratified to know that notwithstanding the determined effort which was made, that the bill providing for the repeal of this law was defeated in the Colorado Senate by a vote of 28 to 3.

In summing up these matters Senator George Lewis said:

"Opposition to the amendments comes from labor agitators who feel that their calling is jeopardized by the law, because under its provisions their power to order men out into battle against law and order is fast ebbing away. They are of that class of men who would destroy industry to perpetuate their own power.

"I have seen these labor wars; I know these labor leaders. Yet I have never seen the bodies of the Grant Hamiltons, the Ed Doyles, the John Lawsons or the Billy Haywoods lying stiff and stark in death when the smoke of battle cleared away. The dead are always the poor deluded followers of these men, and the latter could always be found in safety and luxury afterward, seeking new followers to drive before other guns."

As was noted in the March issue, open threats have been made on the part of labor leaders that unless this law was repealed its provisions would be openly violated. It is to be hoped that these threats were made in the heat of passion and does not represent the sober judgment of organized labor.

In a democratic government no citizen or collection of citizens, even though it may be in the majority, is justified in the violation of a law. The good citizen will immediately undertake to convince enough of the majority that his position is right in order that at the next election his theory may be put into effect by the representatives whom a majority shall elect. Any other course is un-American, and a menace to the liberties of the people.

WILL COPPER PRODUCERS' EXAMPLE BE EMULATED?

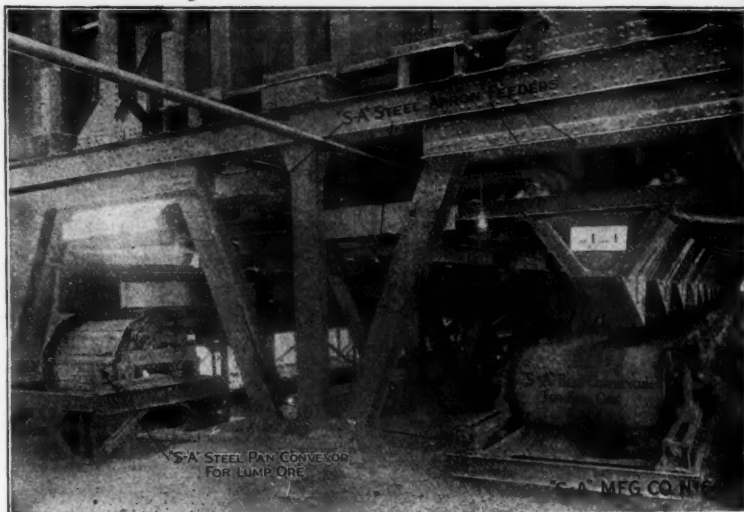
Action of the copper producers of the United States in offering their product to the Government at normal prices is an act of generosity and patriotism that we do not expect to see emulated in many of the industries. With an active market for copper at 37 cents, nearly every producer in the country has agreed to join in furnishing the Government 45,000,000 pounds at 16 and a fraction cents. Will the producers of cotton, wheat and other products be as generous?

To realize just how generous is this offer of the copper producers, it should be applied to all other materials which the Government will have to buy for the prosecution of the war. It is to be hoped that the Government will meet the same spirit on every hand and be able to buy many of its supplies on the basis of the average price of the ten-year period preceding the war.

After all the demagogic talk about the war spirit being manufactured by those profiting from the munitions trade, this action of the copper men comes as a fitting rebuke. To those in a position to

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know the facts, these charges have been given scant consideration, because they know these charges are baseless. Unfortunately, all of the people have not been in a position to know the facts and many, especially among the less informed elements of the population, believe that there is truth in the assertion. It is difficult to reach the uneducated and more difficult still to change an opinion they once formed. Such an unusually magnanimous act, however, should go far toward convincing everyone that there are no more patriotic citizens than these men to whom unkind reference frequently has been made.

MINING AND CONSERVATION

Mining is the only business in which the world's supply for all future generations is already in existence. It is the business where true conservation theories should apply with greatest force. Its inherent tendencies toward self-destruction cannot be avoided and cannot be reduced to the minimum except through cooperation. Those who by mutual agreement control the production of the mineral wealth of the country are more subject to prosecution than are those who limit the supply of wheat, because the farmer is made immune from the provisions of the Sherman law by the Clayton bill.

Is it not time that a united stand should be taken by the mining men of this country to be put on a different footing from other industries? Mining is the only business the life of which is shortened by its activity and success.

ORGANIZED LABOR

A specially sensitive friend of THE MINING CONGRESS JOURNAL takes exception to some of its editorials upon the general question of the relation of employer and employe, and asks whether we mean to favor the abolition of labor unions. We are glad to reply, because no permanent good can be accomplished without a clear understanding of the basic principle involved. THE MINING CONGRESS JOURNAL is not opposed to labor unions. On the contrary,

it believes in organized labor and believes that it has accomplished great good. It believes that the organization of labor into unions is almost a necessity under present-day industrial conditions.

It is probably impossible for the American Mining Congress to add to the number of its friends by standing for the right of laboring men to organize in unions or as they please and in a legal way to fight for their demands, and at the same time insist that labor, when so organized, shall be required to obey every law and that every law enacted shall be equally applicable to all citizens. It is more likely to draw to itself the criticism of those upon one hand who believe that the acts of organized labor must necessarily always be right and those upon the other side who do not believe that labor has a right to organize for the purpose of bettering its conditions and increasing its wages.

It is only when organized labor undertakes by force and in violation of law to gain advantage that we condemn its acts. It is when the representatives of organized labor openly threaten to violate law and to defy the edict of the courts that we believe them to be subject to the most severe criticism.

THE GEOLOGICAL SURVEY AND PREPAREDNESS

The Geological Survey is by law established not only for the survey, with mapping and description, of the mineral resources of the country and for the diffusion of information relating to them, but also for the accounting of the drafts made on these stores each year and for the reporting on the status of the respective mineral industries. It is therefore both logical and to be expected that the Survey should in this period of general inquiry as to our preparedness for defense give the public the benefit of its knowledge and experience as based on its geological investigations and statistical information. The country should not have to depend on committees from academic or technical associations for information which the governmental branch especially

founded for such purposes, though inadequately sustained in its work, may be able to furnish more easily, with greater accuracy, and with an authority that has earned the confidence of the people.

ANOTHER WESTERN OPPORTUNITY

The adjournment of the Sixty-fourth Congress without affirmative action upon the various bills affecting the public lands and power resources of the West is a matter of great congratulation. It leaves open one more opportunity for the West to organize a movement designed to prevent the revolutionary changes, which have been proposed by the leasing bills, in the method of control and development of those western resources upon which its future greatness must rest.

The West is under special obligation to those of its Senators who stood squarely against the radical changes of policy which were proposed, and who did not allow themselves to be swerved from their devotion to a great underlying principle of government in order that temporary gain might be secured.

It may not be surprising that opposition to this new system has been so desultory and spasmodic. The individuals who have been interfered with by virtue of this policy are few in number and the public does not appreciate that preventing the development of enterprise has the same effect as the stifling of an enterprise already developed.

ACCIDENTS AT METAL MINES, 1915.

The Bureau of Mines has just issued its fifth annual report on accidents at metal mines in the United States. This report was compiled by Albert H. Fay as Technical Paper 168, and contains 114 pages of detailed information concerning accidents and their causes, by groups of mines, as copper, iron, gold and silver, etc.; and also classified by States and mining methods. Wherever possible figures are given for each of the five years. Data of the character con-

tained in this report will be of much assistance to operators, and accident compensation commissions in establishing a just insurance rate, and at the same time point out to operators and miners the chief causes of accidents, so that they may be able to tackle mine hazards from the proper angle.

The report for 1914 contained details of mine accidents classified by mining methods. The 1914 figures are supplemented in the 1915 report with similar data, and from this it is an easy matter to point out some of the principal hazards of each of the various systems of mining as room and pillar, overhand stoping, steam-shovel mining, etc. The mining-method statistics are illustrated by two diagrams, which show the relative hazard by causes for each of the mining systems studied. The metal-mine accident figures in a number of tables are reduced to a 300-day basis, so that comparisons are on absolutely the same basis. Comparative figures are also given for the coal mines, quarries and metallurgical plants. Details are also given showing accidents due to explosives. At the close of the report is a brief summary of the State laws as related to inspection and compensation laws with reference to the reporting of accidents.

The bureau is to be congratulated on the completeness and comprehensiveness of this report. It is through reports of this character that the bureau is aiding the mining industry, yet were it not for the cooperation rendered by the mining companies it would not be possible to supply them with classified and detailed information regarding the hazard of the industry. The fatality rate of 3.64 per 1,000 men employed, and the non-fatal accident rate of 2.32 per 1,000 are entirely too high. The diagnosis of the risk is given in this report from which remedies may be prescribed by inspectors, safety engineers, operators and individual miners.

ALASKA COAL FOR THE NAVY

The present world situation demonstrates most forcibly the unwisdom of the activities of the Federal Government

looking to the alleged conservation of the coal resources of Alaska. That the coal supply of the Pacific Coast naval fleet should be carried in bottoms through the Panama Canal and the success and existence of that fleet carry with it all the perils of the transportation of this coal is a situation which cannot be regarded with equanimity.

In considering this particular situation it will be remembered that coals from the Matanuska coal field in Alaska, after thorough test by the Navy Department, were pronounced to be equal in value for naval use with the coal of the Pocahontas field. The Pocahontas field is ready to supply fuel not only to the Pacific Coast fleet, but also to the Atlantic Coast fleet. These fields were developed by private enterprise. Development of the Matanuska coal fields has been denied to private enterprise; the fields are undeveloped; the Pacific Coast fleet cannot have fuel from that source for its use, and the un wisdom of the course followed by the Federal Government needs no additional demonstration.

The failure of the Sixty-fourth Congress to enact any of the so-called leasing bills and the failure of several preceding Congresses to pass any except the Alaskan coal leasing bill, which thus far has demonstrated its absolute unworkability, opens to the West another opportunity to arouse itself and make a united and determined effort to be allowed to work out the development of its industrial life in accordance with local requirements.

PRICE REGULATION

The recent agreement made under the auspices of the Federal Trade Commission, by which the manufacturers of paper and publishers by agreement fixed the price of print paper for the current six months at $2\frac{1}{2}$ cents per pound, has accomplished a substantial benefit to the users of print paper without doing injustice to the manufacturer.

The Federal Trade Commission makes it clear that it is not undertaking to act

as an agency of the Government to fix prices, but is serving only as an arbitrator.

It has been assumed that a threat of prosecution by the Department of Justice was the impelling inducement which brought the manufacturers of print paper, who are receiving much higher prices for their stock, to come before the Federal Trade Commission and agree to accept a lesser price and that the agreement entered into was a means of escape from possible penalties under the Sherman Anti-Trust law.

To accept this is to assume that the Federal Trade Commission and the Department of Justice in their dual capacity make up the single agency with the power which many believe should have been given to the Federal Trade Commission direct.

Many of the original advocates of the creation of a Federal Trade Commission urged it upon the ground that there was a twilight zone between unfair competition and fair business combination in which dishonest men were able to cover up unfair business transactions and which honest men were loath to enter. It was contended that the Trade Commission should be given the power to supervise business combinations and give its approval to such as would make for greater efficiency in the production, distribution and exchange of the articles of commerce, and which would not add unfair burdens upon the consuming public. It was believed that this function should be kept entirely separate from the Department of Justice, which could prosecute without other restriction than that its final judgment should be a mandatory order prohibiting a continuance of the act complained of.

Another phase of this question is evidenced by the recent indictment of a number of coal operators in the Pocahontas and New River regions of West Virginia. The conditions surrounding the coal operations which are complained of are in some respects similar to the situation in the paper-price issue referred to. A radical difference lies in the fact that the paper manufacturers

control the greater part of the paper production of the country, while the coal operators referred to produce less than 4 per cent of the coal production of the United States.

In both instances the price had increased in about the same ratio as the price of all other products. It is not generally believed that any convictions will result from these prosecutions. Coal prices had everywhere advanced and there seems to be an equal reason why indictments should be laid against the producers of every other product with market prices so high as to justify public complaint. It has been intimated that these indictments were returned with a hope that it would result in more reasonable prices. This is perhaps another way to reach that field of service which the original advocates of the Federal Trade Commission hoped to have it perform, namely, that it should exercise the same authority with relation to general business affairs that the Interstate Commerce Commission does with reference to transportation matters.

CAPTAIN JACK, THE POET- LARIAT OF THE AMERICAN MINING CONGRESS

The death of John Wallace Crawford, of Woodhaven, L. I., on February 28, removes one of the picturesque figures of the early development of the West, and a man who was particularly well known to the members of the American Mining Congress during the early days of its history.

Capt. Jack Crawford, the poet-scout, was a breathing spirit of patriotism and an inspiration to all the better things of life. He was wont to call himself the "poet-lariat" of the American Mining Congress, and always maintained his interest in the organization. The following photographic reproduction of one of his most inspiring poems will be read with interest by the old-time members of the Mining Congress:

To

My friend A. Pard-J. F. Callbreath, Jr.

* A Sunshine Boomerang.

When a bit of sunshine hits ye
After 'passin' o' a cloud,
An' a fit o' laughter gits ye,
An' yer spine is feelin' proud.
Don't fergit to up an' fling it
At a soul that's feelin' blue,
Fer the minit that ye sling it
Its a boomerang to you.

The other Side. *Key*

When a streak of bad luck nips you
An' you're down an' almost out,
When the devil's see-saw rips you,
Think of this old Broncho scout.
Often busted, bruised and bleeding,
But the hand that held the rod,
Was the hand that I was needing
The Almighty hand of God.
Your friend,

Sept. 25th,
1911.

J. W. Crawford
apt. Jack
Poet Lariat M.C. C?

TIME FOR WESTERN ACTION

It is time that a comprehensive effort shall be made through which the West shall agree upon a general plan which will not hamper western development but at the same time will meet the reasonable demand which has furnished the basis of the so-called conservation movement, namely, that national resources shall not be permitted to pass into the hands of private monopoly.

That part of this program which requires that the national resources of the Western States shall continuously pay tribute to the Federal Government is unjust in principle and entirely antagonistic to the constitutional rights of the several States.

What the West needs is a comprehensive platform upon which all may agree and a comprehensive demand that this platform shall be carried out by the Federal Government. What are the principles upon which it would seem all could be brought to support?

First, that national resources shall not be permitted to pass into private ownership under conditions which prevent public control in case this ownership is used to public disadvantage. Second, that the national resources within any State shall be utilized for the development and support of the public institutions of that State. Third, that the control of this development shall be with those who are interested in the State's growth, who are so situated that executive action can be made to fit the changing demands of industrial life and not subjected to the restrictions of a cumbersome body thousands of miles away, lacking the knowledge or possibility of having that knowledge which would insure intelligent action. We believe these principles will meet with the support of the West and that no other part of the nation can successfully contest the justice of these demands.

COOPERATION UNDER FEDERAL SUPERVISION

A recent referendum of the United States Chamber of Commerce upon the question of combinations as related to natural resources demonstrates that the business interests of this country are overwhelmingly in favor of proper business combinations. The report of the board of directors to the fifth annual meeting, held in February, 1917, contains the following:

"The Sherman law was devised to aid, not to hinder, American business. Conditions particularly in the coal and lumber business have been such of recent years as notoriously to lead to waste of these natural resources, while neither capital nor labor found that profit and wage in them and such healthy conditions of production as they deemed essential. A limited form of combination was put forward as a remedy for these conditions and a special committee submitted to the board a report recommending a certain latitude of combination under strict federal supervision. This report was issued to referendum vote November 28 and the voting closed January 12, 1917.

"Referendum No. 17.

"The committee recommends that there should be remedial legislation to permit cooperative agreements under Federal supervision in those industries which involve primary natural resources, on condition that

the agreements in fact tend to conserve the resources, to lessen accidents and to promote the public interest.

"1,034 votes in favor; 110 votes opposed."

It is believed that there are many reasons why the mining industry should receive special consideration from government agencies. An editorial statement by the Black Diamond, a leading coal trade journal, says:

"The Government can limit the profit of the coal men today if it will allow them to limit their losses tomorrow. Every coal man in America would make that trade in five minutes if the Government should propose it."

The production of the mineral resources of the nation is too vital to its prosperity to be the subject of haphazard control or foolish prosecution. It has a right to reasonable and continuous profit. But a small part of the excess prices now being paid for coal goes in the pockets of the coal producer. The larger part of the coal which has been sold upon the market at the abnormally high prices of the past year has been under contract at the old prices, some of which are very much below the present cost of production. To illustrate: A West Virginia coal company a few weeks ago sold a car of coal at \$1.60. The consignee before paying for the coal, sold and delivered it to another broker and then made an assignment for the benefit of his creditors. That car of coal passed through the hands of seven different brokers before it reached the consumer and was actually sold at a price several times greater than the original price.

These facts were made public through the efforts of the coal producer to collect the price for this car of coal, and this company is now under indictment because it proposes to ask \$3 for coal for which the consumer is paying \$7. Surely there is need for a better cooperation in the management of the coal business.

PREPAREDNESS AND DEVELOPMENT

The public was quickly aroused when the Canadian embargo upon the transmission of electrical power at Niagara Falls prevented the production of cya-

nide and other chemicals which were essential to industrial production, and Congress quickly responded to that demand by the passage of an act which permitted the development of more power from the American side of the river.

The public was not quickly aroused by the fact that the development of other water-power resources within our borders had been for years prevented by Federal prosecutions based on technical grounds, which not only prevented the development of this particular enterprise, but served warning upon others that investments in such enterprise would be subject to attack.

In the recent contest concerning the oil leasing bill, objection came from those who had made investment under the law and who sought only to protect the investment which they had already made, and which under the proposed law might, through technicalities, be confiscated by the Government.

These prosecutions were based upon the theory that the public interest was to be protected thereby. The fact is that so far as water-power development is concerned, the State laws have full authority to regulate and control the production of hydro-electric power, this authority growing out of the necessity for use of waters for irrigation purposes. The pretense that the people of the State of Colorado are to be protected from monopoly by the confiscation of the rights of way of the Colorado Power Company is too flimsy to be accepted by any except visionary conservationists who believe in the conservation policy of the Indian—which conserves everything and uses nothing.

What the country needs is the development of its resources. The present world situation intensifies the need, not of conservation but of development and production.

Germany's great strength in the present world conflict was immeasurably increased by its prompt acquisition of the mineral fields of Belgium and eastern France. Undeveloped mines, unharnessed water powers and oil resources 2,000 feet below the surface will be of little use in that preparedness which is

today of great necessity. This development is of unmeasured importance to the nation as a whole. It is particularly important to the western States. Is it not time that these States should undertake in a systematic and comprehensive way to show the nation at large the importance of maintaining the system of government control of public lands, which has demonstrated its practicability.

HILL AND McGRAW COMPANIES

EFFECT A COMPROMISE

The McGraw Publishing Company, Inc., and the Hill Publishing Company, New York, have been consolidated as the McGraw-Hill Publishing Company, Inc. The new company acquires all the properties and interests of the two constituents, including the following technical journals:

Electrical World, Electrical Railway Journal, Electrical Merchandising, Engineering Record, Metallurgical and Chemical Engineering, the Contractor, American Machinist, Power, Engineering News, Engineering and Mining Journal, and Coal Age.

Two of these papers, Engineering News and Engineering Record, will be consolidated under the name, Engineering News-Record, with Mr. Charles Whiting Baker, now editor of Engineering News, as editor-in-chief.

Mr. James H. McGraw will be president of the new company, Mr. Arthur J. Baldwin (now president of the Hill Publishing Company), vice-president and treasurer, and Mr. E. J. Mehren, vice-president and general manager.

TECHNICAL MEN LEAVING

GOVERNMENT SERVICE

Technical men are leaving government service in greater numbers than ever before. The loss to the Geological Survey and Bureau of Mines is becoming acute. It is very evident that steps must be taken very soon to permit substantial increases of salaries.

Dr. Douglas Retires.

George Notman, secretary of Phelps, Dodge & Company, has issued this announcement: "Effective this date, Dr. James Douglas has resigned as president of this company and has been appointed chairman of the board."

"Metal Statistics" Out

"Metal Statistics" for 1917 has been issued by the American Metal Market and Daily Iron and Steel Report. The American Metal Market is the pioneer daily newspaper in the metal, iron and steel trades. The convenient sized volume is the tenth annual edition of "Metal Statistics." New data has been included in the work this year. C. S. J. Trench and B. E. V. Luty are the editors of the American Metal Market.

SURVEY FURNISHES ARMOR PLANT BOARD MUCH DATA

Exact information as to the nearest source of ample supply of the minerals needed for the conduct of the Federal armor plate plant has been requested of the Geological Survey by the board having this matter in charge. The Interstate Commerce Commission has been called upon to furnish information with regard to freight rates on these necessary minerals entering into the armor plate. Gas-producing and steam coal, bessemer pig iron, nickel, ferrochrome, ferro-manganese, ferrosilica and flux are necessary factors in considering the location of the plant. The fluxes are specified as limestone, dolomite and fluorspar.

Nothing has developed in Washington during the past month to indicate that the supposition that West Virginia would get the armor plate plant is likely to be wrong. It is pointed out, however, that Ironton, Ohio, which is across the river from Huntington, West Virginia, possesses all the advantages for the plant offered by Huntington.

The following is a tabulated estimate of the raw materials which will be required annually in the production of 20,000 tons of armor:

	Tons.
Coal, gas producing.....	150,000
Coal, steaming.....	150,000
Bessemer pig.....	30,000
Nickel.....	1,200
Ferrochrome.....	2,600
Ferromanganese.....	200
Ferrosilicon.....	50
Limestone)	
Dolomite } fluxes.....	5,000
Fluorspar)	

The gas producer coal should be reasonably free from sulphur.

The pig iron heretofore used in the process of the manufacture of armor plate, as developed by the armor makers in this country, is known commercially as Bessemer pig and contains less than one-tenth per cent of phosphorus. The following is the specification for the pig iron required by one of the armor makers:

Phosphorus.....	under .1%
Sulphur.....	under .04%
Silicon.....	.9 to 1.35%
Manganese.....	under .75%

The armor steel scrap forms about 50 per cent of the charge of the furnace and is obtained from the ingot discards and the trimmings from the armor plates.

The ferromanganese, ferrochromium and ferrosilicon are market commodities.

The limestone, dolomite, fluorspar and burnt lime are used as fluxes.

BUREAU OF MINES STUDYING IMPURITIES IN OXYGEN

With the increase in the use of breathing apparatus in mine-rescue work, the Bureau of Mines is becoming increasingly interested in the oxygen prepared to use with this apparatus. Recently a number of explosions of oxygen confined in tanks have been reported. This led George S. Rice, Chief Mining Engineer of the Bureau, to begin an investigation of the impurities in oxygen which cause these explosions.

Some criticism of the electrolytical process of making oxygen has been voiced, but Mr. Rice declares that it is not a question of discountenancing the electrolytical or any other process of manufacture, but rather a matter of specifying the amounts of impurities that the oxygen may contain. The Bureau of Mines has found for its own use that the hydrogen contained must be less than two-tenths of 1 per cent and that the nitrogen contained must be less than 2½ per cent.

GEOLOGISTS TO DO OIL WORK IN CENTRAL AMERICA

Henry Hinds, E. R. Lloyd and D. D. Condit, of the Geological Survey, have been granted a leave of absence for six months to accept employment during this time with the Sinclair Central American Oil Company. They will be engaged in oil investigation in several of the Central American republics. Since exploratory and geological work in that section throws valuable light on the petroleum problem of the coastal plain region of the United States, Director Smith of the Geological Survey is glad that this opportunity for outside work has been offered.

PURCHASES OF COAL BEING MADE MORE METHODICALLY

Inquiries from manufacturers and other consumers of fuel as to sources of supply of coal and coke are reaching the Geological Survey in greater numbers than ever before. Such an increase in the interest in this particular point is something of a surprise to Survey officials, who are not able to account entirely for the volume of requests of this nature which are being received. The fact that fuel purchases are rapidly being reduced to a more methodical basis, however, is a source of much satisfaction to coal specialists of the Government service.

Drawback on Spelter

Drawback has been allowed on spelter manufactured by the Pearlman Co. (Inc.), of Clarksburg, W. Va., wholly with the use of duty-paid ore or with the use of such ore in combination with either ore imported in bond, domestic ore, or both.

INDIVIDUAL FITNESS OF THE NATION'S MINING ENGINEERS SOUGHT BY DEFENSE COUNCIL

Bureau of Mines, Cooperating With American Institute of Mining Engineers, Sends Out Blank Asking for Information Which Will Show How Engineer Can Help Country in Case of an Emergency

During the early months of the war in Europe nearly every nation engaged sacrificed the lives of highly valuable technical men by allowing them to go into the thick of battle. In many cases individuals were sacrificed who were worth to their countries more than the lives of hundreds of men not so well qualified to assist in mobilizing the resources of the country.

In order that the United States may secure the maximum of service from each of her citizens in case of war, efforts are being made by many agencies to classify those who are fitted to take up special duties in which they will be of particular value. As a part of this work the Council of National Defense has requested that a list of all mining engineers be compiled by the Bureau of Mines in cooperation with the American Institute of Mining Engineers. The same request has been made of the Bureau of Mines with regard to the chemists of the country. This work is being undertaken in cooperation with the American Chemical Society.

The following letter, signed by Van H. Manning, director of the Bureau of Mines, and Philip N. Moore, president of the American Institute of Mining Engineers, has been addressed to the mining engineers of America:

"By request of the Council of National Defense, the Bureau of Mines, in cooperation with the American Institute of Mining Engineers, will prepare a classified list of the mining engineers and metallurgists of the United States. Data covering the qualifications, experience and skill of each engineer are desired to determine the line of duty in which he can best serve the country in time of need.

"European experience has shown that nothing is more important in time of war or national emergency than a knowledge of the qualifications and experience of expert technical men. It is, therefore, important, especially at present, that this information be available in the United States.

"You are accordingly requested as a patriotic duty not only to fill out the card which you will receive herewith, but to see that every engineer and metallurgist within your acquaintance receives one and does likewise. Additional cards will be furnished upon request. You will please check only those subjects in which you are expert, especially where you have had actual mining or metallurgical experience. Please return the card promptly, using the inclosed franked en-

velope. The information received will be carefully classified, carded and indexed. Your prompt response to this matter will be very much appreciated."

Accompanying this letter will be a blank on which the following questions are asked:

Name; present address; permanent address; date of birth; where born; where were your parents born; married or single; number of dependents for whose support you are wholly responsible; partially responsible; are you an American citizen; if naturalized, give date; health; eyesight; hearing; bodily disability, nature of; institution where graduated; date of graduation; degree; what foreign language do you speak; in what countries have you had experience and how much; technical societies of which you are a member; please list positions held during the past five years, naming special duties of each; present position, occupation and employer; publications; reports or papers, give titles and where published, or indicate the fields to which you have contributed; in case of emergency, how and where, in your opinion, could you be of most service to this country; present military connections; please check the following kinds of mines in which you have had actual experience, coal, copper, gold and silver, iron, lead, zinc, petroleum, rare metals and other minerals; give character of machine and repair shop experience, if any; state in what metallurgical method you are proficient.

Under the head of "mining and metallurgy" the following questions are asked, with the stipulation that the number of years service as foreman, engineer, superintendent or manager be specified:

Construction (building); construction (machinery); development work; designing and drafting; dike and levee construction; drainage and pumping; dredging; erection of machinery; explosives (mine and quarry); hydraulic mining; prospecting (with boring machines); quarrying; steam shovel mining; surveying mine or topographic; tunnel and shaft work under compressed air; underground mining.

Under the heading of "ore reduction" the length of experience is again called for after the following questions:

Assaying; ore concentration; alloys, ferrous; alloys, nonferrous; aluminum and magnesium; antimony, bismuth and cadmium; chromium and manganese; copper; gold and silver; iron and steel; lead; mercury; nickel

and cobalt; platinum metals; radium and uranium; silicon and titanium; zinc.

THE SUPREME COURT'S DECISION ON THE ADAMSON LAW

Washington Times.

Chief Justice White's luminous opinion on the constitutionality of the Adamson law, embodying the decision of the majority of the court, is another assertion of the practically limitless power of Congress over the whole subject of interstate commerce. A good many cobwebs are brushed away in the rendering of this decision. The contention that the law was one regulating the hours of labor only, and the argument that it was a wage question pure and simple, are both dismissed with the remark that both contentions are right and both are wrong, in so far as they are mutually exclusive. The power of Congress in the matter of fixing the hours of labor is undisputed.

The question of fixing wages was a more difficult one to determine. The learned Chief Justice seems to place the right in this case on the emergency which called for the exercise of congressional power. Employers and employees have failed to agree. There was no standard by which both could be guided in the fixing of wages. Therefore, considering "the entire interruption of interstate commerce which was threatened, and the infinite injury to the public interest which was imminent, it would seem inevitably to result that the power to regulate necessarily obtained, and was subject to be applied to an extent necessary to provide a remedy for the situation." The theory was brushed aside as absurd that "the existence of a public right and the public power to preserve it was wholly under the control of the private right to establish a standard by agreement." Also the theory that emergency cannot afford a reason for the exertion of a power of Congress.

The decision is a far-reaching one. Justice McReynolds, in bowing to the will of the majority, though dissenting, declares that the majority decision gives Congress authority to fix maximum and minimum wages of the trainmen, and also the power "to require compulsory arbitration of labor disputes and to take measures effectively to protect the free flow of commerce against any combination whether of operatives, owners or strangers."

The whole matter rests upon the foundation principle that "the business of a common carrier by rail is in a sense a public business."

OTHER COMMENT

Washington Star.

The Supreme Court decision, affirming the constitutionality of the Adamson law, is a

victory for the brotherhoods for today. It is a greater victory for the general public for all the tomorrows until, if ever, the decision is reversed.

For this decision is interpreted to mean that Congress has the constitutional power to constitute itself a court of compulsory arbitration and to prevent by legislative regulation of wages and working conditions the national paralysis of a nation-wide railroad strike.

In effect the American people, hitherto disregarded in the clash between the railroads and their employees and suffering more than either of the combatants from this clash, have been made potentially through their representatives in Congress the tribunal to arbitrate these disputes.

The public interest, hitherto unconsidered in these battles, may hereafter, if Congress wills, receive primary consideration.

May Congress exercise this great power with courage and wisdom!

Asked to Aid Mining Congress

At a recent meeting of the Alaska Bureau of the Chamber of Commerce of Seattle, B. F. Millard called the attention of that body to the work being done by the American Mining Congress, and suggested to the members that they take a greater interest in the work being done by the Mining Congress.

EXAMINATION SOON FOR JUNIOR MINING ENGINEER

Work continues to be handicapped in the Geological Survey and Bureau of Mines by inability to secure some classes of technical assistants. The demand for technical men has pushed salaries far beyond those that are being paid by the Government, and as these high salaries are being accompanied in many cases by long-time and favorable contracts the number of men leaving the Government service is increasing. The greatest difficulty is being experienced in securing the grade of men necessary to fill their places. In most cases there are few persons on the eligible list of the Civil Service Commission. Usually communications to men on this list develop the fact that they are not willing to accept the salaries which the bureaus can afford.

There always, heretofore, has been one list which was well filled. This is the eligible list for the position of junior mining engineer. It is this examination which usually appeals to young men on leaving college. Even this list, however, has become sadly depleted and the Civil Service Commission will announce shortly examinations throughout the country in the hope of stocking up the list of eligibles for the position of junior mining engineer.

**GOVERNMENT EXPERTS WELL
KNOWN TO MINING MEN**



DONNELL FOSTER HEWETT
Geologist

Donnell Foster Hewett was born at Irwin, Pa., June 24, 1881. He attended public schools in Washington, D. C., from 1886 to 1895. He was a student in the Georgia School of Technology, in Atlanta, Ga., from 1895-1897. Mr. Hewett was a student in Lehigh University from 1898-1902. His degree of metallurgical engineer from that institution was obtained in 1902. He continued at the university as an assistant in metallurgy and mineralogy for a year.

In 1903, Mr. Hewett entered the employ of the Pittsburgh Testing Laboratory as mining engineer. During the period from 1903-1909, he examined metalliferous mines in the western States, as well as in Ontario, Canada; Chihuahua, Sonora, Sinaloa, Durango, and Jalisco, Mexico; and in Peru. From 1909 to 1911, he was a graduated student in geology at Yale University. Mr. Hewett, in 1911, entered the United States Geological Survey as junior geologist, and worked for the field seasons of 1911, 1912, and 1913 on the areal and economic geology of Oregon Basin and Grass Creek quadrangles, and Bighorn Basin,

in Wyoming. These quadrangles contain important resources of coal, oil, and gas. In 1914 and 1915, he worked with J. F. Pardee on the areal and economic geology of the Sumpter quadrangle of Oregon. The area contains most of the productive gold mines of eastern Oregon. Preliminary reports on all of these areas have been issued or are in process of publication. In 1916, Mr. Hewett examined vanadium mines in Peru.

From 1902 to date, he has written the chapters on manganese production for the report on mineral resources. In 1913, he was promoted to the rank of associate geologist, and is now a member of the Section of Western Areal Geology.

**TRADE COMMISSION TAKES
REVOLUTIONARY ACTION**

The Federal Trade Commission, March 14, notified the country's leading anthracite coal producers that any failure to grant the usual spring price reductions cannot be justified by claims of increased cost of production. The commission has heard, the notice says, that producers intend to withdraw or reduce the regular seasonal discounts, on the ground of increased mining costs.

In its inquiry into the cost of mining anthracite, the report on which soon will be issued, the commission has obtained detailed information on the costs of companies which mined in 1916 about 75 per cent of the total production of anthracite. "This information," says the commission, "obtained directly from the records of the companies referred to, indicates no increase in average cost in the last four months of 1916, and further indicates an actual decrease of cost in the case of some of the companies whose cost of production is high.

"Judging from the tonnage produced in January, 1917, there is no reason to believe that costs thus far in 1917 will materially change the average shown by the figures compiled from September to December, 1916. Therefore it is the opinion of the commission that further increase in circular prices this spring, by failure to grant the customary discounts, cannot be justified on the basis of increased cost.

"The commission makes this statement in advance of the forthcoming report, because it is a matter of vital interest to the public that no unjustifiable increase in price be made.

"This statement does not refer to increases in circular prices of all anthracite in May, 1916, nor to the panic prices which have prevailed on part of the tonnage this fall and winter, concerning which the commission will make a report in the near future. The cost data already compiled by the commission, however, are conclusive against price increases this spring."

RENO CELEBRATES SELECTION AS MINE RESCUE STATION

Seated comfortably in his home in Washington, March 10, Van H. Manning, Director of the Bureau of Mines, addressed a distinguished audience nearly 3,000 miles away, at Reno, Nev. The occasion was the annual engineering day celebration of the University of Nevada, with the added feature of a celebration of the selection of Reno as the general headquarters for one of the new mine-safety stations of the bureau with a mine-rescue car to respond to disasters and to teach the miners first-aid and rescue work.

The Governor of Nevada, members of the State legislature and several men prominent in the mining industry were present at this transcontinental telephony demonstration, which was arranged to take place at 9 o'clock, Nevada time, corresponding to midnight, eastern time.

Exactly upon the stroke of 12 Mr. Manning was notified by Prof. J. G. Scrugham, dean of the College of Engineering of the University of Nevada, that Washington had the right of way over the wires across the continent and that the audience, each member of which had a receiver to his ear, was ready for the greetings from the director of the Bureau.

Mr. Manning said: "The Bureau of Mines deeply appreciates this kind invitation to extend its more cordial greetings to the citizens of the great mining State of Nevada. We have been watching with the keenest interest from year to year the phenomenal increases in your mineral production and wish to extend our heartiest congratulations to a State that can increase its mineral production from \$34,000,000 in the year 1915 to \$52,000,000 in the year 1916, an increase of \$18,000,000, or about 52 per cent. The Bureau of Mines is interested in a State which can show mining dividends in one year of more than \$11,000,000. I venture to say that very few States can show a per capita mineral production of nearly \$500 and a per capita dividend of more than \$100.

"We have watched with increasing admiration the modern development of your methods of mining and the many extensions to your mines and mills.

"The Bureau of Mines considers it a privilege, after planning for several years to extend its work more broadly through the metalliferous mining districts of the United States to be able to place in your State, on April 1, a new all-steel mine-safety car, with headquarters at Reno. We have always felt that with the development of mining must come the development of safety. Safety first properly applied means a lessening death roll, a minimum of physical suffering and mental anguish, greater prosperity to the mining industry, and consequently bigger dividends.

"This mine-safety car will be at your service

for greater safety. It will carry a mining engineer, a mine surgeon, a miner trained in rescue work, and a miner trained in first aid. Their collective duties shall be to cooperate with the miners, operators and State officials of Nevada and the mining districts of the adjoining States, as well as with the faculty and graduates of the Nevada School of Mines, in furthering safety, sanitation and health in your mines and mining communities.

"I firmly believe that under the cooperation of all concerned in the mining industry—and none is more concerned than the citizens of Nevada—real progress will be made to make mining in the districts surrounding Reno as safe as human agencies can make a naturally hazardous calling.

"On behalf of the bureau and the Secretary of the Interior, I wish to give thanks for the hearty greetings extended to the bureau. I am sure it will be an inspiration to all in the bettering of conditions in the great mining industry."

TELLS OF CONTRIBUTIONS OF SURVEY TO PUBLIC SERVICE

In an address to be delivered before the Men's Forum of Binghamton, N. Y., April 1, Geo. Otis Smith, the director of the U. S. Geological Survey, will discuss the contributions of a scientific bureau to the public service. He will show that there is a broader idea now than forty years ago; that the natural wealth of the nation is to be used for benefit of the many and not the few; that the public service idea now is shared by corporations, but that public servants must lead in this work for the people.

He also will point out that the United States Geological Survey is the largest organization of its kind in the world and that the investigation of the natural resources of the United States includes topographic mapping of the surface, geological examination of rock formations and ore deposits, measurement of streams, classification of public lands, and the publication of results with the distribution of the information to the public.

The outlook of today he will say includes full utilization of our country's resources, wisely rather than wastefully; a national prosperity for centuries through present efficiency. The lessons of the past two and a half years, with respect to a larger measure of industrial independence, will be brought out.

Pan-American Book Out

The official publication telling of the second Pan-American Scientific Congress, which was held in Washington the beginning of last year, has been published in Spanish and is being distributed in Latin America.

PROGRESS IN MINERAL INDUSTRIES SINCE WAR BEGAN TO BE SHOWN IN BULLETIN

**Geological Survey Preparing Extensive Publication Which Will Show What Has
Been Accomplished Under Stress of War Market and Decreased
Importations—David White Discusses Forthcoming Work**

A few weeks after the opening of the European War the Geological Survey published Bulletin 599. That publication outlined what might be expected of the United States in the development of industrial independence. A new bulletin now is being written which will show what has been accomplished toward this end. Each mineral affected by war conditions is to be the subject of a review by the individual geologist who is regularly assigned to the study of that particular mineral. In this way the Survey will be able to gather into one volume the best thought and the latest information at the disposal of the Federal government.

The new bulletin will show the present studies of mineral production and will give much information as to the development which has taken place in the mineral industries since the outbreak of the war. Special attention will be given to the experience which has been gained since that time. Emphasis will be placed upon the demands and conditions which the United States will have to face in case it is called upon to enter into active prosecution of hostilities.

David White, chief geologist of the U. S. Geological Survey, in discussing the new bulletin, says:

"The Director contemplates the publication of a review of the present status of mineral production and the mineral industries from the standpoint of the developments witnessed and the experience gained since that forecast was printed just after the outbreak of the war, and with special reference, as is now most timely, to the conditions and demands that will confront the country should it become engaged in war.

"Bulletin 599 is predictive and is based on previous development in the mineral industries and the status at the time of our information as to latent resources and mining and metallurgical progress in this country. Obviously the new bulletin will start from the date of writing 599 and taking the estimates and predictions of the latter as the text make note of what has actually been accomplished under the extraordinary stimulus of foreign war markets on the one hand and of restricted or even totally obstructed importations on the other. It would seem appropriate that such a publication might present a brief review of the conditions controlling recent developments, of what has been accomplished, and how it was brought about. This notation of the present drift in the respective industries is essential to the discussion of the future and to the perspective grasp of the great problem which is the real motive of

the new bulletin, namely, the ability and the extent to which the mineral industries can meet possible superimposed demands of war in this country, both with and without export of certain commodities for foreign war consumption. It would be germane to discuss at this time the capacities of the war mineral industries, their probable or real limits as to mining and as to treatment (smelting, coking, refining); the rate of expansion under pressure as estimated on the basis of what has been achieved since September, 1914; the adequacy of the mineral reserves and the possible development of new reserves of special type to meet greater demands or replace importation; the need for further information as to raw materials, and the mineral problems and exigencies which may probably confront the country in case of war.

"The Director instructs that each mineral subject concerned with the war conditions be treated by its responsible geologist and under his own name. Most of the articles will be prepared from information already in the minds or close at the hands of the respective authors. The preparation of the bulletin should be viewed as emergency matter and as representing the Survey's best information at the present moment."

CARRANZA SAYS HE WILL NOT CONFISCATE MINES

Ambassador Fletcher, at Mexico City, telegraphs that General Carranza has informed him that mine owners who are unable to operate their properties in Mexico should apply for an extension of the time within which to resume work, and that he assured the ambassador that in all cases where the conditions were such as to make it impossible to resume work an extension would be allowed. General Carranza further said it was not his government's intention to confiscate mining property, but that it would proceed according to the dictates of equity and justice.

The ambassador suggests that mine owners who are unable to operate and who have not applied for an extension should immediately make application for such extension. The applications should be made in the Spanish language, to the Minister of Fomento, Mexico City, giving title, size, location, number, and name of the property, together with the reasons for failure to work the property. Each application or petition should be accompanied by the last tax receipt and should bear a 50-cent Mexican documentary stamp.

NEW MINING GLOSSARY TO CONTAIN 30,000 WORDS

Probably as many as 30,000 special words applying peculiarly to the mining industry will be contained in the new glossary of mining terms which is being compiled by the Bureau of Mines. The work was started two years ago, but as the demand for it has become more evident, every effort is being made to hurry it to a conclusion. Even in view of the additional time being expended on this work there is probably a year's compilation ahead. The idea of furnishing the mining industries with an unabridged glossary originated with A. H. Fay, statistician of the bureau.

NEW MAP OF ANTHRACITE REGION TO BE ISSUED

A very important addition to the supply of information with regard to the anthracite industry is soon to be published. The United States Geological Survey is cooperating with the anthracite bureau of information in the publishing of a bulletin which will contain an elaborate map of the anthracite region of Pennsylvania. The map will show mines, breakers, limits of seams and a great volume of other information which thus will be presented graphically. The map will be accompanied by a particularly instructive text.

BUREAU OF MINES STUDYING MERIT RATING STANDARDS

Merit rating standards are being studied by the officials of the Bureau of Mines with the hope that a system which will be practicable in every way will be devised. It is believed that ratings on a percentage basis can be arranged so as to permit of uniform work in different mines. The general enactment of workmen's compensation laws and the increasing amount of insurance being written is making imperative the development of a system which will permit of the standardization of mine ratings.

Safety First Calendar.

An illustrated calendar has been issued by the Kingston Coal Company, of Kingston, Pa. and distributed to all its employees asking the cooperation of each in the effort to prevent accidents and to further the welfare and civic uplift of the communities in which they reside. Each page of the calendar contains a number of abstracts of the safety measures of the mine law, and this presentation in attractive form, together with interesting views in and about the mines, it is believed by Mr. F. E. Zerbey, the general manager of the company, will have more effect than the printed abstracts posted about the mine, as provided by the anthracite mine law.

USEFULNESS OF MINE-RESCUE TRAINING DEMONSTRATED

Safety in mines requires, in addition to precautions to prevent accidents, provision for emergencies in case of mine explosions, fires, or accidents. The presence of deadly gases makes it especially dangerous for men to enter a mine, unless they are equipped with breathing apparatus or proceed with the fresh-air current. After the recent mine explosion at the Wilburton mine, Wilburton, Okla., in which two shot firers were entombed, four rescuers attempted to enter the mine on the return air side and proceeded less than 100 feet when they were overcome, and in attempting to rescue these four men eight others met with the same fate. The twelve men were finally brought to the surface in an unconscious condition and by prompt and efficient artificial respiration all except one were revived. These men were revived by miners, all of whom had previously received first-aid training from Bureau of Mine instructors.

The miners who were at this scene, and especially those overcome, are outspoken in their appreciation of the efficacy of the first aid rendered and express a determination to familiarize themselves with first-aid methods.

The utility of formulating rules and providing for emergencies is not so evident when a mine is working satisfactorily as it is after the mine has exploded.

In a recent disaster at an Alabama coal mine, in which several men were killed, a rescue party equipped with breathing apparatus reached the mine about two hours after the explosion. Nearly all of the bodies were recovered by these men, it being impossible for persons not wearing apparatus to enter the mine workings. Some of the bodies were still limp when recovered and an effort was made to revive these persons, but without success. This shows the usefulness of breathing apparatus at mine disasters when men trained in the use of apparatus are available and the apparatus is in good condition. Some of the men who took part in this work were being trained at the time of the disaster. One of the State mine inspectors wore apparatus and participated in the rescue work; another acted as a reserve and administered artificial respiration.

Honey Boy Company Floated.

B. F. Millard has financed the Honey Boy Mining Company. The property lies 22 miles from Cordova, Alaska. The vein is 125 feet wide. It is near salt water, 2 miles from the Copper River Railroad. One hundred-ton barges can be loaded at Cordova and towed by launch to the property. There is ample water power available.

ACCIDENTS IN METAL MINES ARE TO RECEIVE ADDITIONAL ATTENTION FROM GOVERNMENT

Bureau of Mines Appoints Engineer Who Will Make Special Study of Safety in Metalliferous Operations—B. O. Pickard, of Phoenix, to be in Direct Charge of Work

Accidents in metal mines are to receive closer attention in the future by the Bureau of Mines, and B. O. Pickard, of Phoenix, Arizona, has been appointed safety engineer of the bureau to give special attention to this work. Since the foundation of the Bureau of Mines, every effort has been made to extend its work in the metal mining industries. From the fact that it was thought that many of the problems concerning the coal industry were more urgent, this part of the work was provided for first by Congress. It has been uphill work to secure additional appropriations for the important extensions of the work to the metal mining industry. While it has been possible to conduct some very important metalliferous work, almost from the outset of the bureau's activities the lack of appropriations has been a serious handicap to the bringing of the metal mining work up to the same standard of excellence which has characterized the work on coal mining problems.

The appointment of Mr. Pickard and his assignment to accident problems in metal mines marks an important addition in the bureau's efforts to be of assistance to the metal mines of the country. Congress also is showing a keen appreciation of the work the bureau has done in the coal mining industry and appropriations for similar work among the metal mines apparently will be easy to obtain in the future.

Mr. Pickard will be in charge of this work under the immediate direction of D. J. Parker, the mine safety engineer of the bureau. Mr. Parker will specialize in similar work in coal mines.

LOGIC OF PREPAREDNESS SHOWN BY NOTED ENGINEER

The nineteenth annual session of the Canadian Mining Institute was held at the Ritz-Carlton Hotel, in Montreal, March 7-9.

The morning of the 7th was devoted to papers and discussions on "National and Industrial Preparedness." In the afternoon the principal subjects were "Magnesite," "Potash," and "Molybdenum."

Wednesday evening Dr. Henry M. Payne, of New York, and Mr. H. W. DuBois, of Philadelphia, gave stereopticon talks, and Dr. Alfred C. Lane, of Tufts College, Massachusetts, delivered the feature address of

the session, entitled "Preparedness Among Animals." This paper was so unique and evidenced such careful research work that Dr. Lane was the center of a group of interested interrogators throughout the session.

Starting with the amoeba, he traced the evolution of animal life through the various geologic periods, showing diagrams of the internal structures in order to make plain that that organism with the head or best central government, the best cooperating cells and organs, and the quickest to see danger and to act on what it saw, was the one best prepared for life's battle. He summed up the factors of preparedness, either animal or national, as: (1) Alertness, (2) activity, (3) pre-vision or foresight, (4) provision, (5) internal cooperation, (6) external cooperation, (7) centralization of the vital organs and nervous system. He showed how various diseases start in the body and similar diseases form in a nation from an analogous disturbance, interrupting the cooperation between human units. He stated that the use of poisonous gases for defense had been introduced by the skunk, the barbed-wire defense by the porcupine, and the domed turret by the turtle.

The whole address was so startling and so clear that doubt hardly could remain in the minds of the audience regarding the logic of national preparedness. In response to the claim of the pacifist, that military training breeds war-like tendency, the doctor asked his hearers if being a butcher produced human murderers.

The Thursday sessions were given over to electrolytic zinc processes, iron and clay working, and flotation.

Thursday evening was the annual banquet, at which a committee of seven, representing the Mining and Metallurgical Society of America, presented the gold medal of that society "for distinguished service" to Mr. Edward P. Matheson. The presentation was made by Dr. W. R. Ingalls. The American Institute of Mining Engineers was represented by President P. N. Moore; the Institution of Mines and Metallurgy of Great Britain by Mr. Edgar Rickard, and the American Mining Congress by Dr. Henry M. Payne.

Friday was devoted to visits to ammunition plants in the vicinity of Montreal and a luncheon at the works of the Dominion Bridge Company.

**GOVERNMENT EXPERTS WELL
KNOWN TO MINING MEN**



G. P. LOUGHLIN
Geologist

Gerald Francis Loughlin was born in Hyde Park, Mass., December 11, 1880. He graduated from the Boston Latin School in 1898; received the S.B. degree at Massachusetts Institute of Technology in 1903; Ph.D. at Yale in 1906. From 1906 to 1912, he was instructor in economic geology and petrology at Massachusetts Institute of Technology, devoting his summers largely to work for the United States and the Connecticut State Geological Surveys. Since 1912 he has been permanently connected with the United States Geological Survey, devoting most of his time to the study of metalliferous deposits. Since 1914 he has also had charge of investigations related to the stone and lime industries. His principal work in mining regions includes detailed studies of the geology and ore deposits of the Tintic district, Utah; of the Magdalena district, N. Mex., and the oxidized zinc ores of Leadville, Colo. He has made briefer studies of several smaller districts in Utah; of the Eureka, Nevada, and the Ochoco (Howard) district, Oregon.

**METTEGANG RECORDER
GIVING SATISFACTION**

Excellent results are being obtained by the Bureau of Mines in the use of the Mettegang mechanical recorder for measuring the rate of detonation of explosives. The recorder is being used by the Bureau of Mines at Pittsburgh.

**SINGLE BUREAUS GET MORE
AID THAN ALL MINING**

"In the Department of Agriculture single bureaus, such as the Bureau of Animal Industry, the Bureau of Plant Industry, the Forest Service, the States Relations Service and Meat Inspection, each received more money than is allotted by the Federal Government for all mining." (Extract from address of Van H. Manning at the Mining Congress Convention.)

Decides in Favor of Mining Company.

In rendering a decision on a grievance brought by certain employees of the Nesquehoning colliery of the Lehigh Coal & Navigation Company before the Board of Conciliation, and which was referred to him as umpire, Dr. Charles P. Neill holds that the rate sheets are not absolutely unquestionable and that a rate which has been in effect and recognized as standard is to be accepted, whether it appears upon the rate sheet or not.

The umpire held that the company had fully and conclusively established its contention that the two-thirds rate was an established rate at the colliery, going back even prior to the date of the award of the Anthracite Strike Commission, and the grievance, therefore, was not sustained.

New Book on Briquetting Published

A valuable publication has just come from the presses of the J. B. Lippincott Company, of Philadelphia, in "A Hand Book of Briquetting," by G. Frank. Mr. Frank is the professor of mining and briquetting in the Kgl. Bergakademie, Berlin. The translation was made by Fred C. A. H. Lantsberry, head of the Birmingham Small Arms Company's laboratory. With the increase in the demand for briquettes, this work will appeal to all those who are interested in the technical side of this industry.

Canadian Institute Issues Report

The transactions of the Canadian Mining Institute for 1916 have been printed and are being distributed. Arthur A. Cole is the president of the Canadian Mining Institute, and H. Mortimer-Lamb is the secretary-treasurer of the organization. The work contains a number of important papers by engineers of international reputation.

WORK TO BE DONE AT SEATTLE STATION OF BUREAU OF MINES OUTLINED IN DETAIL

Use of Electricity in Recovery of Metals, Study of Coals and the General Metalliferous Problems of the Northwest to be Taken up in Comprehensive Way, Declares Dorsey A. Lyon

Work at the mining experiment station at Seattle is to be divided into three main divisions. Dorsey A. Lyon, the superintendent of the station, classifies the work as follows:

1. Determining how far it may be profitable, and feasible, to use electricity in the recovery of metals from their ores by electrothermic and electrolytic processes

2. A study of the coals of the Northwest and of the west and southwest coast of Alaska, for the purpose of (a) determining how they may be mined with the least possible waste, and (b) the beneficiation of low-grade coals so as to render them suitable for fuels for domestic and industrial use.

3. A study of the problems connected with the treatment of the ores of the Northwest and of the west and southwest coast of Alaska, in so far as such problems may differ from those now being studied at other stations of the bureau.

Since national interest is being manifested in the conduct of the new mining experiment stations, officials of the Bureau of Mines are particularly anxious that the public have a clear outline of the work. It is expected that similarly concise statements of the work at the other mining experiment stations will be forthcoming shortly.

The greatest interest is evident in the use of electricity in the treatment of ores. For this reason the work at Seattle is certain to be watched with the greatest interest by the entire metallurgical industry.

The impression seems to have been gained that the Seattle station was to be devoted entirely to metalliferous work. Since Mr. Lyon puts the coal work of the Seattle station in second place, it can be seen that this portion of the station's activities are not to be neglected. The western portion of Alaska is included in the territory to be surveyed by the Seattle station, and the coal mining industry in that portion of the territory is certain to develop into a very important one. On the development of the coals of western Alaska the prosperity of a considerable portion of the peninsula depends.

George S. Rice, Chief Mining Engineer of the Bureau of Mines, is very much encouraged by the results of laboratory work conducted by Prof. E. J. Babcock on coals from the Nenana field. Professor Babcock has demonstrated that this coal can be briquetted successfully. The briquettes which he has made have been found to be

equal to the good grades of steam coal. There is every reason to think that the laboratory tests were conducted under such conditions as to insure the production of briquettes on a commercial scale. Owing to the prohibitive prices to which wood has risen in eastern Alaska, it is essential to the continuance of many mining operations that the Nenana coals and lignites be made available for fuel. In the light of Professor Babcock's work, Mr. Rice is very hopeful that one of the most serious problems that has confronted the mining industry in a very highly mineralized territory soon will have been solved.

The Pacific Northwest Mining and Metallurgical Experiment Station, Bureau of Mines, Department of the Interior, has by this time been organized and commenced work on its various problems. The personnel of the staff is as follows:

Dorsey A. Lyon, metallurgist and superintendent of station.

George Watkin Evans, coal mining engineer.

Francis C. Ryan, electrometallurgist.

Harlan A. Depew, chemist.

Union B. White, clerk.

Superintendent Lyon, in outlining the work for this station, said: "At the present time the majority of our metallurgical processes are carried out in some form of a combustion furnace, which means that carbon in some form has to be burned. Therefore, the widening of the scope of those metallurgical processes in which the electric current is used, either for its thermal effect or for the electro-deposition of metals, means that our coal and oil resources will be conserved, for one of the greatest resources of the country is its water power. This water power is not depleted by use, but may be used continuously as long as the mountains stand. Therefore, one of the principal lines of investigation which will be taken up at the Pacific Northwest station will be a study of electrometallurgical processes, for the purpose of determining to what extent it may be possible to commercially apply such processes, either electrothermic or electrolytic, to the treatment of the major nonferrous metals. It may be that special problems will also be taken up in connection with the production of iron, steel and other alloys.

"Another line of investigation that will be taken up in connection with the work of the station at Seattle will be a study of the methods used on the Pacific coast for mining coal, with the idea of devising ways and means of

preventing the waste of coal which may at present take place in mining.

"It is hoped, with the help and cooperation of the coal operators of the State of Washington, to also install a coal-testing laboratory which will permit of the carrying on of investigations having for their object the beneficiation of the low grade, and at present practically valueless, coals which are found in the Pacific Northwest States.

"It is also hoped that ways and means may be found of taking up cooperative work with various industrial concerns, as for example the steamship companies, the railroad companies, etc., and with the department of mechanical engineering of the University of Washington, as regards the proper utilization of low-grade coals, and of those coals which may be beneficiated as a result of washing, etc.

COOPERATIVE WORK WITH THE UNIVERSITY OF IDAHO

"As a part of its work on the mining and metallurgical problems of the Pacific Northwest, the bureau has entered into a cooperative agreement with the University of Idaho, whereby an ore-dressing experiment station is to be located at Moscow, Idaho, and cooperative work carried on with the mining and metallurgical departments of the University of Idaho. In this work the problems met with in the treating of lead, silver, and zinc ores of the Coeur d'Alene type will receive special attention, as will the problems on ore dressing which may be encountered in other mining districts of the State. Mr. Thomas Varley, who for several years has been in charge of the ore-testing work for the Federal Mining Company in various parts of the United States and Mexico, and who has only recently entered the employ of the bureau, will have charge of the bureau's work at Moscow, and will work in cooperation with the departments of mining and metallurgy of the University of Idaho.

"As a part of the cooperative work which is to be undertaken in Idaho, a survey of the many mining districts throughout the State, of which there are over a hundred, will be undertaken during the coming spring and summer, in order to determine what metallurgical problems demand first consideration.

COOPERATIVE WORK WITH THE OREGON BUREAU OF MINES AND GEOLOGY

"The bureau has entered into a cooperative agreement with the Oregon Bureau of Mines and Geology, whereby it will assist that bureau in dealing with the problems which present themselves to the mining interests of that State. Prof. Will H. Coghill, professor of metallurgy at the Oregon State Agricultural College, will represent the bureau as consulting metallurgist in this cooperative work.

"One of the first things that will be undertaken in connection with this work will be a grouping of the various kinds of ores which are typical of the various mining districts of

the State, for the purpose of determining, as far as possible, the suitability of present-day metallurgical processes to the treatment of these ores, and especially as to whether or not those which have to be concentrated before shipment can be effectively and efficiently treated by the flotation process.

"The station will also make an effort to be of value to the mines of southeastern Alaska and to these of Montana."

SHIELDS WATER POWER BILL DIES WITH CONGRESS

Unable to compose differences of opinion upon at least three points which were regarded as fundamental, the Senate and House conferees on the Shields water power bill were discharged. This action killed the Shields water power bill, as well as the bill which Representative Adamson sponsored in the House.

In a brief statement Representative Adamson, of Georgia, chairman of the House Committee on Interstate and Foreign Commerce, summed up the differences which the Senate and House conferees were unable to bridge in order to arrive at an agreement. He said:

"There were three points of difference. First, the conferees of the Senate insisted on the classification of grantees. The House conferees insisted that any man who could raise the money might build a dam by complying with the provisions and terms of the law.

"Second, the House insisted on the right of the Government to impose an arbitrary charge with the power of the Government to change that charge at stated periods without the consent of the grantee. The Senate conferees objected to any charge in money, but maintained that the matter ought to be left to the States in which the dams might be located.

"Third, the Senate conferees insisted that Congress grant consent in this act for the Secretary of War to pass on all applications without further action on the part of Congress. The House conferees insisted that Congress should pass on each separate proposition.

"But for these three differences the conferees could easily have agreed.

"There was much merit in both bills. Both bills contained complete regulatory provisions and both provided amply for full protection of the public. But neither body would yield on the three propositions nor could any satisfactory compromise be reached. So, after five conference meetings, the matter was abandoned as hopeless."

The conferees on the part of the Senate were Senators Shields, Bankhead and Nelson, and the House conferees were Representatives Adamson, Sims and Esch.

The Shields water power bill passed the Senate by over a 2 to 1 majority and its enactment would have resulted in an impetus to industrial development in water power States on a scale now impossible without the utilization of the water power up to this time unharnessed and going to waste.

SEVERAL SMALL NITRATE PLANTS ARE LIKELY TO PRECEDE LARGER STRUCTURE, IS BELIEF

Interdepartmental Board Returns from Hearings as to Location of Government Plant—Impressed with Resources of South—George Otis Smith and Dr. Chas. L. Parsons Represent Mineral End of Investigation

Hearings have been conducted in the places being considered as the possible site for the Federal nitrate plant. These hearings were before an inter-departmental board composed of the following: Secretaries of the Interior, Agriculture, and War; General Black, chief of the engineer corps of the army; George Otis Smith, director of the U. S. Geological Survey; Dr. Chas. L. Parsons, head of the division of mine technology of the Bureau of Mines; Colonel Keller, of the engineer corps; Colonel Wheeler, of the division of ordnance; Oscar C. Merrill, of the forest service, and J. C. Caruthers, of the nitrate experimental laboratory.

Hearings were conducted at Columbia, S. C., Augusta, Ga., Atlanta, Birmingham, Tuscaloosa, Nashville, Louisville, and Wheeling, W. Va. In addition a day's trip was made on the Tennessee River between Decatur and Florence, Ala. A visit was made to the phosphate rock district near Mt. Pleasant, Tenn. The board inspected the by-product coke ovens and the steel plants at Ensley, Ala., and the by-product plant at Holt, Ala., on the Black Warrior River.

The new steam-electric plant at Beech Bottom near Wheeling, W. Va., also was visited.

The mineral resources of the regions represented at the hearings were presented fully by geologists and mining men. Hydro-electric data were presented by engineers. Each member of the board is thoroughly impressed with the richness of the States visited in those mineral resources essential to the establishment of a large and varied electro-chemical industry.

A coal operator who spoke from the fullness of practical experience is said to have been the best witness who appeared during the entire trip.

Secretary Lane expressed himself as being confident that this nitrate development is going to be in the South regardless of the particular site or sites which may be selected for the Government nitrate plant.

It is believed by some in Washington that several small nitrate plants will be established first with the idea of developing from practical experience whether it is practicable to use one large plant or whether it will be best to have nitrates developed at a number of smaller plants.

Dr. Parsons and Dr. Smith are in charge of the mineral portion of the investigation.

Takes Over New Claims

The Granite Gold Mining Company, of Alaska, has taken over four adjoining claims,

which adds materially to the old company and probably insures its working for many years.

NEW PLANT TO FURNISH 1,000 TONS OF POTASH MONTHLY

A most important addition to the potash supply of the United States comes with the development of a new field of production at Searles Marsh, in the extreme northwest section of San Bernadardino County, California, not far from the famous Death Valley country. Secretary Franklin K. Lane, of the Department of the Interior, is in receipt of information announcing that a large modern potash plant has just been completed by the Pacific Coast Borax and the Solvay Process companies, and that operations will be begun about the first of the month.

It is estimated that the output will be about 1,000 tons per month of muriate of potash, 80 per cent or better pure potash. A new process for the refinement of the raw product has been solved by the two companies, and is reported to be most satisfactorily successful. The new field is included in about 1,500 acres of patented land owned by the interested concerns, so that there are no obstacles to the conduct of operations once the machinery is started. Railroad facilities have been extended to the field and the owners announce that they are "absolutely confident" they will be turning out the tonnage stated.

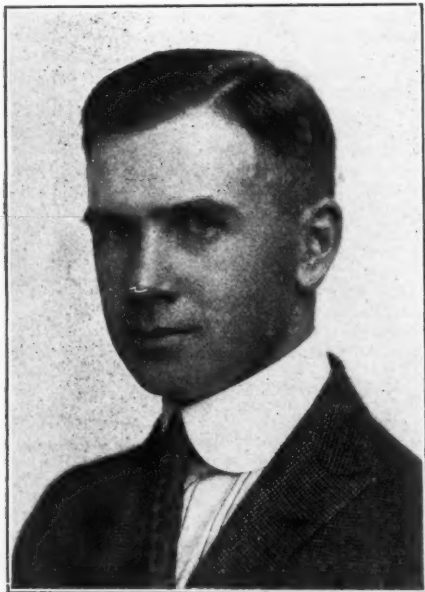
The operation of this new plant may be expected to arouse wider interest in the development of such industry in this country. This product is mainly used for fertilizing purposes. Heretofore the main production came from Germany, but since the European War this supply has been cut off. Since the outbreak of hostilities, the price has risen from \$40 to about \$400 per ton.

LIMESTONE BELT AS A VEIN

A stratum of limestone through which a mineral streak containing ore bodies can be traced and with overlying and underlying beds of quartzite marking its limits and that can be followed on its bed through a network of openings from the apex to certain disputed ore bodies, is a vein within the meaning of the United States Statutes granting extralateral rights.

Wall vs. United States Mining Company, 232 Federal, 613, p. 615.

GOVERNMENT EXPERTS WELL KNOWN TO MINING MEN



E. K. SOPER
Metallurgist

E. K. Soper, recently appointed consulting metallurgist of the Bureau of Mines, is a graduate of the geology and mining department of Stanford University. He took graduate study in economic geology at Cornell University and at the University of Minnesota. He received the degree of M.A. at the University of Minnesota, where he also completed the work for the degree of Ph.D. Mr. Soper was for two years a member of the faculty of Cornell University. He served as instructor of economic geology. He was for four years a member of the faculty of the University of Minnesota, and was three years on the Minnesota geological survey. Mr. Soper served as a geologist for the American Smelting and Refining Company in Mexico.

For the past two years Mr. Soper has been the head of the department of mining engineering of the University of Idaho. He is well known to mining men, as he has made numerous examinations of mines and mineral lands in California, Colorado, Minnesota, Michigan, Wisconsin, North Dakota, Montana, Manitoba, Alberta and Idaho. He is a

member of the American Institute of Mining Engineers and was Idaho's delegate to the 1916 convention of the American Mining Congress at Chicago. He is the author or joint author of several bulletins of the Minnesota Geological Survey and of numerous articles in technical journals.

Explosion Tests Made.

In two explosion tests at the experimental mine, in which the mixture of coal dust and shale dust used was the same in each case, ignition was obtained when the dust was distributed one-third on the cross shelves, one-third on the side shelves, and one-third on the floor; but was not obtained when all the dust was placed on the cross shelves and side shelves with none on the floor. The total loading in each case was two pounds of coal per foot of entry.

In tests with coal from the "E" seam, Cambria County, Pa., a mixture of 60 per cent 20-mesh shale and 40 per cent 20-mesh coal, 10 per cent of which would pass through 200-mesh, would not propagate an explosion started in a 50-foot zone of pulverized Pittsburgh coal dust, with no gas in the ventilating current; but would do so with 1 per cent of gas in the air. A mixture of 60 per cent pulverized shale and 40 per cent pulverized coal propagated an explosion.

SURVEY OF THE MINERAL RESOURCES OF EAST TO BE MADE

A survey of the mineral resources of the Far East, including China and Siberia, will be undertaken this spring by the Bureau of Foreign and Domestic Commerce, of the Department of Commerce. J. Morgan Clements, mining engineer and geologist of New York City, has been selected for the work and is preparing to leave for the Orient in a few weeks.

The object of the survey is threefold. For the benefit of American capital, a thorough study of the undeveloped mineral resources of the various countries will be made. For the benefit of American manufacturers of mining machinery and equipment, a report will be made on mines and smelters now in operation and on opportunities for the sale of American outfits. For the benefit of American users of minerals from the Far East, a study will be made of the conditions which have in the past made it necessary to buy such minerals through middlemen in Europe.

Before leaving for the Far East Mr. Clements will visit American concerns that are interested in some way with the development of the mineral resources across the Pacific and get a definite idea of specific points that ought to be cleared up.

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EARLY SESSION OF CONGRESS MAY SAVE EMBARRASSMENT

By calling Congress in extra session the President relieved the directors of the United States Geological Survey and the Bureau of Mines of much anxiety with regard to the conduct of their work during the next fiscal year. The sundry civil bill, which carries the appropriations for these bureaus, failed to pass in the legislative tangle which characterized the closing of the recent session. In order to arrange their work for the coming fiscal year, it is necessary for directors of bureaus to know several months in advance the amounts of money which will be appropriated.

Even if prompt attention is given the sundry civil bill on the convening of Congress, considerable loss and inconvenience will be occasioned. This is particularly true with reference to the Alaskan work of the Survey. For climatic reasons it is necessary to have the geological parties in Alaska early in June. This makes it necessary to have the complicated arrangements for the season's work ready in advance of that time. In order to get the best results, the money for the Alaskan portion of the work, at least, should be known definitely the first of March. In the same manner other work of the Survey which requires preliminary planning is likely to suffer. The same applies to many of the activities of the Bureau of Mines.

The failure of the army appropriation bill also has resulted in some uncertainty at the Survey due to the fact that it carried an appropriation of \$200,000 for topographic mapping. While the appropriation was made for the War Department, it was understood

that the work was to be done by the topographic branch of the Survey.

One of the items in the sundry civil bill which had been relied upon to relieve a very annoying condition was that allowing purchases up to \$50 to be made by members of the Survey staff without the formality of advertising for bids. This regulation has been a very expensive one in many cases. Field parties of the Survey oftentimes would be delayed so as to allow the regulation as to advertising for bids to be complied with. In some cases a party having an aggregate pay roll of hundreds of dollars a day would be kept idle while bids were being secured on a \$50 purchase, necessary to the continuance of the work. The carrying out of the regulation was particularly ludicrous in Alaska. Many times geological parties would have to post their advertisements and wait for the submission of bids in villages where no member of the community was able to read. The impracticability of this arrangement applying to small purchases was recognized long ago in the War Department and army supplies up to \$500 may be purchased in the open market when it is impracticable to advertise for bids.

DuPonts Buy New Factory.

The DuPont Fabrikoid Company, with main offices at Wilmington, Del., has purchased the Marokene Company, of Elizabeth, N. J. The Marokene Company manufactures a material, similar to fabrikoid, which is used extensively by the automobile, carriage, and upholstery industries.

R. B. Heyward, who has been assistant superintendent of the Fabrikoid Company's Newburgh plant, will become superintendent of the Marokene plant at Elizabeth, N. J. No changes will be made to the present staff of employees.

The purchaser will make thorough investigations in order to learn if any improvements can be made to the product and, if possible, will better same, thus upholding the DuPont standard.

All the sales transactions of the Marokene Company will be under the direction of the Wilmington office, and the attention of J. K. Rodgers, sales manager of the DuPont Fabrikoid Company.

Intercollegiate Bureau Meets

George S. Rice, chief mining engineer of the Bureau of Mines, represented Columbia University at a preliminary meeting of the Intercollegiate Intelligence Bureau. The object of this organization is to prepare for the Government of the United States the names of American college students and alumni who would be willing to enter the service of the Government in time of expected or actual war.



INTERIOR BUILDING WHICH WILL BE THE NEW HOME OF THE GEOLOGICAL SURVEY AND THE BUREAU OF MINES

NEW INTERIOR BUILDING TO BE OCCUPIED MAY 1

On May 1, the 5,000 government clerks and officials under the direction of the Department of the Interior will move from the many scattered buildings throughout Washington, to the department's new home—the largest government building, with the possible exception of the Capitol.

This structure, which occupies two entire city squares and which costs Uncle Sam \$2,000,000 without mechanical or office equipment, is surpassed in floor space by only one other building in the United States—the Woolworth Building in New York City. But in contrast to the towering Woolworth Building, the new department building is only seven stories high.

The practical completion of the building means several things. It marks another step in the Government policy of assembling all branches of individual departments under one great roof. It shifts the center of governmental activities in Washington. It is so large that the Geological Survey has been called upon to take its measurements in the same way that it would take the measurements of a mountain in the Rockies. The survey will weigh the building to a pound. The number of tons of terra cotta in it will be determined, as will be number of miles of water pipes and electric wires, the size of the panes of glass

which all of its windows would make, and the length of time it would take a charwoman to wash all of the windows.

FOUR MILES OF MAIN CORRIDORS

This is the first time that any such computations of any large building have been made. It is estimated that if a newsboy should attempt to start at the top of the building and leave a newspaper at each of the one thousand rooms the news would be stale by the time he reached the main floor. If he were a fast walker he might complete the stunt in three and one-half hours. There are nearly four miles of main corridors alone.

Although the structure is only seven stories in height, its floor space approximates 785,000 square feet, an area larger than most truck farms near Boston. The terrazzo used in the entrances and corridors would have a four-acre plot of land. If placed end on end the slate slabs used to trim the bases of the interior walls would extend twenty-seven miles. Nine million bricks are concealed behind the exterior walls of limestone. Incidentally, there are 220,000 cubic feet of limestone.

OUTLINE SQUARE

The building is nearly square, each side being approximately four hundred feet long. Supporting the building are 7,500 tons of structural steel, a small amount considering the size of the building, but small because the

building is low and does not require the heavy steel girders which are absolutely necessary in towering skyscrapers.

The huge structure will be delivered to the United States on or ahead of the time specified in the contract. Although it has been the traditional procedure for the government contractor to secure an extension enabling him to complete a building a year or so after the time of delivery first indicated, and although the contractor in this case has been hampered by changes in the plans and other difficulties, he believes now that the building will be ready for occupancy by the middle of April. Be it important or otherwise, this is the first experience that the government has had with Washington's negro labor. In all probability it will not be the last.

HAMPERED IN MANY WAYS

This pile of limestone, brick, steel, slate, marble, and glass has been erected on time in the face of difficulties other than those referred to previously. For instance, there has been the unprecedented freight congestion, resulting in actual embargoes for weeks, if not months, at a time. For two years there has been such a shortage of materials that many have been unable to fulfill their contracts. Some of the steel for the building was more than nine months behind time in reaching Washington. Added to this Washington has shared in the labor shortage general throughout the East. Twice the Government has held up the work while it contemplated or ordered changes in construction. But for all of this the building is 2.7 per cent in advance of the expected state of completion.

LINES ARE HARMONIOUS

Huge as the structure is, its architecture is in harmony with the general plan of the Mall, one of the beauty zones of the Nation's Capital. It forms with the Washington Monument and the new Lincoln Memorial a great triangle that dominates the western end of the park. It is believed that one effect of the structure upon the civic life of Washington will be the shifting of much of the retail business section of the city. The new building is a mile northwest of the departmental center of the city as it was a year or so ago. The Department of Commerce was the first to move west of the White House. It was followed by the Department of Labor, within a block of the new Interior building. Another great structure is being erected to house the Interstate Commerce Commission. The State, War and Navy Departments are near by. The new executive center of Washington will contain all the governmental departments except Justice, Treasury, and Agriculture.

Resources of Canada

Arthur D. Little, Ltd., of Boston, has published a bulletin on the organization, plan and scope of the natural resources of Canada.

COAL SHIPMENTS DECREASE NINE PER CENT IN FEBRUARY

The following statement of carloads of bituminous coal that originated on fifty-eight railroads and of beehive coke on fourteen roads in February, 1917, was compiled by C. E. Leshner from reports received by the Geological Survey, Department of the Interior, by noon, March 15, 1917. Comparative figures based on reports for February, 1917.

	February, 1917	January, 1917	February, 1916
Number of working days.....	23	26	24
Carloads of bituminous coal, Pennsylvania (13 roads).....	148,290	179,974	183,695
West Virginia, Virginia, Maryland and Ohio (10 roads).....	164,062	199,610	185,501
Illinois and Indiana (16 roads).....	144,522	164,179	148,771
Kentucky and Alabama (6 roads).....	38,785	42,698	33,387
Iowa, Texas, Colorado, and Utah, and Southwestern States (13 roads).....	45,557	53,655	46,080
58 roads...	541,216	640,116	597,434
Carloads of beehive coke (14 roads).....	58,450	72,110	73,124

The decrease in shipments of bituminous coal in February, 1917, compared with January, 1917, was 15.5 per cent, and compared with February, 1916, was 9.4 per cent. The average number of cars of coal per working day was 23,531 in February, 1917, against 24,620 in January, 1917, and 24,893 in February, 1916. The shipments in February were less than in January, which was to be expected because of the fewer working days. These statistics indicate that, except in Kentucky and Alabama, the daily rate of production was lower in February than in January, 1917, and considerably less than in February, 1916. The average daily loading on twenty-three roads in Pennsylvania, West Virginia, Virginia, Maryland, and Ohio was 7 per cent less in February than in January, 1917, and on thirteen roads west of the Mississippi was 19 per cent less.

The shipments of beehive coke in February, 1917, showed a decrease of 18.9 per cent compared with January, 1917, and a decrease of 20.1 per cent compared with February, 1916.

LOW ACCIDENT RECORD DURING 1916 CALLS FORTH MUCH FAVORABLE COMMENT

Striking Evidence of Value of Work of Bureau of Mines, Says St. Louis Globe-Democrat—Lives of Toilers Worth Hundred Times Cost of Safety, Declares Boston Post—Other Comment

The year 1916 was marked by the largest production in the history of coal mining in the United States, with 597,000,000 tons taken from the earth, by an army of three-quarters of a million toilers. The number of men killed was 2,225, which is forty-four less than in 1915, 229 less than in 1914, and 560 less than in 1913.

The death rate for each 1,000 men employed, 3.03, is the lowest in the last eighteen years, at which time about half as many men were employed. There were 269,000 tons of coal mined for each life lost, which is the greatest tonnage per fatality in the history of the United States. The increase in tonnage for each life lost is nearly 35,000 tons over the year 1915. A. H. Fay, statistician of the Bureau of Mines, has collected some newspaper comment on this subject of which some is reproduced herewith.

In commenting on the lowering of the fatality rate at coal mines and the establishment of the Bureau of Mines, the St. Louis, (Mo.) Globe Democrat, February 20, says that:

It was during the latter part of President Roosevelt's administration that an earnest Government inquiry into the alarming frequency and abnormal fatalities of American coal mine explosions was undertaken. Experts from Europe accompanied the late Dr. Joseph A. Holmes in a tour of American coal mining fields, where conditions were studied. As a result of their observations and subsequent scientific inquiry, the Bureau of Mines, established during the Taft administration, has waged a campaign of education in practically every mining district. Mine rescue stations have been established and mine rescue cars maintained. Miners have been trained in rescue work. By the most cordial cooperation of State and national authorities, the mining laws of many States have been improved, looking to the avoidance of accidents. These have fallen short of perfection, for the problem is intricate differing in various mines and in various seasons in the same mines. The movement suffered an ironical blow early in its history when a "model mine" was wrecked by a disastrous explosion.

But the improvement in conditions has been steady, even though the statistics did not always reveal it. One large explosion, involving hundreds of men, would conceal the improvement in a multitude of smaller mines. The 1916 record, consequently, has an element of luck in it, but it is gratifying that the public has such striking evidence of the value of the bureau's work. There is nothing the Government cannot afford to do to make it safer for the men who go down into the bowels of the earth to mine our fuel.

MINERS' LIVES PRESERVED BY SAFETY-FIRST RULE

The conservation of life and limb in a great industry so that the individual may be spared for future service in contributing his share towards the nation's progress is of vital importance. In this connection the Grass Valley and Nevada City (Cal.) Union, remarks that:

Coal mining throughout the United States has been made much safer by the life-conserving cautionary measures instituted by the National Government's Bureau of Mines. To the late Dr. Holmes, belongs most of the credit for instituting this era of greater safety in mining operations. This is a humane work that should be expanded until it provides the utmost possible safety for all men who work in mines. By scientific devices and by rigid care, this naturally hazardous occupation may be made less dangerous to life and limb. Those who toil beneath the earth should have thrown around them every possible safe-guard. It is gratifying that so much progress has been made, in the coal-producing regions, in conserving miners' lives.

In commenting on the changed conditions in the coal mines, and the introduction of modern appliances, the Philadelphia (Pa.) Bulletin, February 20, 1917, makes the following remarks:

The introduction of electric and compressed air machinery in the coal mines, with the consequent elimination of many of the more common causes of explosions, has cut down the casualty list. The safety propaganda instituted by the Federal Bureau of Mines, and the cooperation of many of the most progressive mine owners and operators have also had excellent results. Moreover, the difference in classes of labor employed—in recent years—in the anthracite and bituminous fields has also served to reduce the number of fatal accidents. Fewer ignorant men are now permitted to go underground to endanger their own lives and the lives of others.

Mining is destined to be made safer still, but it will always rank as the most perilous of callings and one whose nature is such as invariably to enlist sympathy for those who are engaged in it.

The above statement may be supplemented, as regards the miner's responsibility, by the following statement from the Philadelphia (Pa.) Record, February 24, 1917:

So far as this State (Pennsylvania) is concerned, it must be evident to all whose memories carry them back some years that serious disasters in the coal regions, both anthracite and bituminous, are much less numerous than they formerly were. Fatal accidents to individuals, too often due to the miners' own carelessness, are unfortunately still common, and will probably continue so for many years. Only a steady uplift in intelligence and prudence can save the men from taking needless risks.

INFLUENCE OF BUREAU'S WORK EXTENDS BEYOND MINING CENTERS

That the results of the work of the Bureau of Mines is being felt in manufacturing centers, far removed from the coal fields, is evidenced by the Boston (Mass.) Post, February 27, 1917, in which it says:

The recent report for 1916 of the director of the Federal Bureau of Mines gives satisfaction to all who have a feeling of sympathy for the man who toils underground. His work is arduous enough without having attached to it the ever present danger of disaster. That mines are steadily improving is now apparent.

We are gradually coming to see that anything that conserves the lives of our toilers of any kind is worth a hundred times what it can possibly cost. The work of the Bureau of Mines is a standing case in point. Yet there are occasionally found people who would like to abolish it.

The work of the Bureau is recognized by the Fall River (Mass.) Globe, of March 1, 1917, in the following language:

That gratifying progress is being made in lowering the number of fatalities among miners in the United States is indicated by the recent report of the director of the Federal Bureau of Mines.

SAFETY FIRST PAYS

The Crafton (W. Va.) Sentinel, March 1, 1917, from the Pittsburgh, (Pa.) Gazette-Times, February 20, 1917, in commenting on the reduction of fatal accidents at coal mines says:

Any way you look at it, "safety first" pays. It may be sordid and brutal to value human life by the dollar standard but since it is the language of our currency that the people understand best, we are compelled to resort to it considering the fruits of the safety movement as disclosed by a statement of the United States Bureau of Mines covering operations in 1916. Last year was the most prosperous in the history of coal mining in this country. More men were employed and the output of coal was greater than ever before, yet the loss of lives in the mines was less than for any other year in a decade.

It is evident that the "safety first" movement is one of the greatest of the national assets. It must be not only fostered but extended. It means not only money to millions, which is perhaps the least valuable of its fruits; it means health and happiness for countless persons to whom they have been denied, the integrity of families and the reduction of poverty and dependence. It can be introduced in every industry with results equally as great as have attended its intelligent application to coal mining.

Thus it is seen that the public is beginning to realize that it pays to be careful, for it is the public that must eventually bear the burden in the loss of useful citizens and increased expense in caring for the injured and their families. The Scranton (Pa.) Times, February 24, 1917, comments on this phase of mine accidents as follows:

The country will be happy to know of the advance of life-saving in our mines. This effort is going to be stimulated, too, by compensation acts for one thing. Under such legislation an injury that in the old days was neglected is treated, reducing the hazard of fatal issues. Greater safeguards are established to prevent fatalities. Why? For two reasons. One is that the idea of social justice, which is plain humanity, is gripping the mine owners more intensively. The other reason is, because it pays. It costs compensation if a man is injured. The industry is made to bear it if a man is hurt or killed. His family must be taken care of at the expense of the industry. So, there is hope that between an expanding humanity and humane legislation the frightful toll of the mines in human life will with every year show fewer deaths, fewer injured and fewer wives widowed and children orphaned.

SAFETY FIRST SUCCEEDS

The Salt Lake City Herald, February 26, 1917, recognizes that the efforts to safeguard the miners are not futile for it states:

While the safety-first propaganda is of comparative recent origin, it has progressed sufficiently to rebuke the criticisms of the cynical who questioned the possibility of the application of mere psychology to a material condition. The great industrial armies of America have adopted the slogan and proved its worth to their entire satisfaction. A recent government report with reference to coal mining clearly demonstrates what safety-first means to many thousands of workmen.

Promoters of the safety-first movement may properly regard this report as evidencing the success of their efforts and justifying their enthusiasm. In the public generally this showing should create a powerful demand that the movement be extended to those industries which have hitherto held aloof. The striking improvement in conditions renders it manifest that even better results can be obtained, and that the development of the maximum of benefit from safety-first rules must be vigorously sought.

This trend of thought is also shown in a statement from the Mahoney City (Pa.) American,

under date of February 27, 1917, which is as follows:

There has never been any reason to doubt that safety-first as a slogan for the great industrial armies of America, would quickly prove its great worth in protecting the lives of employees. These figures are not only convincing as to the effectiveness of safety-first regulations in coal mining, but must be regarded as a powerful demand for further development.

The Dubois (Pa.) Express, February 23, 1917, in speaking of the reduction of coal mines fatalities in 1916, says:

The "Safety first" movement in its application to the industry of mining produced encouraging results during the past year. This showing of the conservation of the life and limb of employees is accentuated by the increase in the number of men engaged in that hazardous work, as well as in the appreciable increase in the tonnage of coal mined over the previous year. The safety methods insisted upon by the Bureau of Mines will lead to a still greater reduction in the percentage of accidents.

From the coal fields of Alabama comes a statement through the Birmingham Age-Herald, February 20, 1917, as follows:

Of all the statistical data compiled for the year 1916, the record issuing from the Bureau of Mines of the United States Interior Department is especially notable in view of the fact that the figures show a large decrease in fatal accidents. Fewer men lost their lives in the coal mines of this country last year than in any year, in the past ten notwithstanding the fact that the output was greater than ever before.

The late J. A. Holmes, who, as director of the Bureau of Mines, had worked with scientific knowledge and characteristic earnestness to minimize disasters from gas explosions, would have been exultant over the government report, because it is the best, relatively speaking, ever presented. Dr. Holmes was hopeful that the day would come when casualties would be greatly reduced, but he probably never dreamed that the number would be so few as last year.

What has been accomplished so far is due to the friendly cooperative spirit that exists between the State mine inspectors, the mine operators, the miners and the Bureau of Mines. The results attained give the Bureau much encouragement to renewed and more vigorous effort in the conservation of the human resources of the country.

ALUMINUM BEING USED

WIDELY IN GERMANY

Interesting facts with regard to the development of the mineral resources of Germany since the war were presented to the members of the staff of the Bureau of Mines in an informal address last month by Prof. A. E. Taylor, of the University of Pennsylvania. Professor Taylor discussed in detail the substitutes which had been found for copper. He declared that aluminum has come into very wide use in Germany, and it is Professor Taylor's belief that important discoveries of means for the recovery of this metal have been made by Germany since the outbreak of the war. Another matter which impressed Professor Taylor while in Germany was the fact that great quantities of iron railroad ties were in evidence everywhere. That production is far in excess of actual needs was very clear. This heavy production of iron, Professor Taylor believes, was due to the necessity of reducing it in order to get the phosphorus content of the ore.

PROSPECTOR STILL ESSENTIAL TO PROSPERITY OF INDUSTRY, NORTHWEST OPERATORS HOLD

He Should Be Supported Financially, It is Agreed, and Should be Considered in Enactment of all Legislation—Northwest Mining Association has Highly Successful Meeting

The annual session of the Northwest Mining Association held at Spokane, February 19-25, was a pronounced success. The membership includes the States of Washington, Oregon, Idaho and Montana, and British Columbia.

Registration showed over 600 present, and on the afternoons of February 21, 22 and 23 sectional meetings of the A. I. E. E., A. I. C. E. and A. I. M. E. were held in conjunction with the association session.

The earlier part of the week was given over to receptions by the various organizations, examination of the exhibits, an informal dance and the work of the committee on resolutions.

On Wednesday afternoon the Pacific Telephone and Telegraph Company gave a fascinating moving-picture exhibit on the building of the Trans-Continental Telephone Line, and in the evening, Mr. F. W. Isham showed some very interesting slides of Alaskan mining, followed by a paper on the "Manufacture and Uses of Pure Iron."

Thursday was "Prospectors' Day," and the principal feature was an address by Prof. Arthur Lakes, formerly of the University of Colorado, now consulting geologist at Nelson, B. C., on "Fissure Veins."

In the general discussion which followed, the rôle of the prospector was clearly indicated and great emphasis was placed on the necessity for supporting the prospector not only financially but by the avoidance of adverse legislation, which can only hamper the mining industry and seriously handicap the hardy pioneers to whom, however, all mining interest is indebted most deeply.

It was at this meeting that prospectors' heaven was defined as "Lake Superior for a reservoir, the Mississippi River for a sluice box, Pike's Peak for a dump, and railroad scales for clean-up."

Closely affiliated with the development of new districts is the construction of proper roads, which was discussed in the papers on "Cement and Concrete" in the afternoon.

Thursday evening was the annual banquet, at which Dr. Henry Mace Payne, of New York, was asked to preside as toastmaster in recognition of the American Mining Congress, of which he was special representative. Among the prominent speakers at the banquet were Dr. Dorsey A. Lyon, of the Bureau of Mines; Prof. Francis A. Thomson, of Pullman, Wash., and Mr. E. Jacobs, of Victoria, B. C., secretary of the western branch of the Canadian Mining Institute.

Friday morning was devoted to a visit at

the Spokane Stock Exchange, and the afternoon to a discussion of "Ore Treatment" and a "Progress Report on the Construction of the Bunker Hill Smelter." This plant is of special interest to the Northwest because it is an independent smelter prepared to do commercial work for individual operators in any quantity, large or small.

Friday evening Dr. Payne gave a stereopticon lecture on "Mining in the Arctic," which was followed by a smoker and cabaret tendered the visitors by the Chamber of Commerce of Spokane.

The Friday noon luncheon at "Ye Silver Grille" was the courtesy of the Business Men's Club.

The following resolutions were adopted during the session:

1. Commending the work of the Washington State Geological Survey and urging a complete topographical survey of the State in county units.
2. Recommending a reduction in the royalty charged by the State on mineral leases of State land and a change from 5 per cent on gross to 4 per cent on net smelter returns.
3. Recommending the appointment of a committee of three by the president of the association to investigate the possibility of an independent smelter and refinery near Spokane.
4. Appointing a committee of three to secure an ore-testing plant in or near Spokane.
5. Urging the Bureau of Mines to make Moscow, Idaho, a full station.

The exhibits of mining machinery, safety appliances, rescue equipment and technical literature were worthy of a national convention. Nearly every prospector and operator present sent samples of his ore, all of which were carefully labeled and advantageously exhibited by the committee in charge. Probably a more comprehensive display of the developed mineral resources of the Northwest has never been made.

The credit for this is due to the Hon. Graham B. Dennis, president of the association, who is also well known to many members of the American Mining Congress.

The arrangements for the convention were under the direction of Mr. F. C. Bailey, the secretary, and his able assistant, Mr. L. K. Armstrong. These gentlemen are indefatigable workers and it has been through their efforts and those of President Dennis that the association now has permanent headquarters at the Spokane Hotel.

The weekly luncheon and social half hour are regular features throughout the year, and at these times Mr. F. A. Ross and Judge Charles A. Gram are potent factors.

Every year a summer excursion is made to the nearer mining camps under the leadership of Secretary Bailey, who is a living exponent of the "get-together" idea.

Among the prominent members is Mr. Sidney Norman, editor of the Northwest Mining Truth. It is safe to say that no mining man ever visited Spokane and met Mr. Norman and went away without a warm feeling for the hospitality of the State, a clearer idea of the immeasurable resources of the great Northwest and an increased sense of personal responsibility to maintain the welfare of the mining industry. As a champion of the prospector and miner, and an aggressive, forceful editorial writer, Mr. Norman has few peers.

An unfortunate event was the fact that the State Legislature is now in session and no prominent State officials could be present. An attempt was made to change the date of the session of the Mining Association, but this met with disfavor on the part of the many prospectors who desired to finish their annual assessment work.

Under a discussion as to what will be the condition of the mining industry after the war, it was generally conceded that the operators of low-grade properties should "make hay while the sun shines," for after the war is over iron, steel, copper and gold will remain relatively stationary during the reconstruction period; lead will do fairly well, but zinc and other metals will go down, so that now is the time for the operator to reduce his operating cost and to develop the most economical method of handling his ores.

MINE SAFETY REGULATIONS ARE PRAISED BY R. J. IRELAND

That the rules and regulations of the Bureau of Mines, looking to preparedness for emergency in case of accidents, are of great practical value is indicated in the following letter from R. J. Ireland, the president of the Owl Creek Coal Company. The letter is addressed to the Director of the Bureau of Mines, and reads:

"I am just in receipt of a complete report from Mr. Barnard, relative to the condition of the mine after our recent fire, and am glad to note thereby that the amount of damage, outside of our loss in tonnage, is not great.

"Mr. Barnard is very profuse in his description of our preparedness for such an emergency, as prescribed by the rules and regulations of your department. In fact, to use his words, 'They are chiefly responsible for saving the property, or at least saving thousands of dollars, and, no doubt, several lives.' His report shows not a single person was even scratched, for which I am personally more than thankful, and feel that the Bureau of Mines should take full credit

for its foresight in prescribing such safety regulations."

B. F. MILLARD EXPRESSES

VIEWS AS TO ARBITRATION

B. F. Millard, the well-known Alaskan mine operator, in a recent letter to the Mining Congress, says:

"I most heartily agree with your taking up the matter in Congress and in every State in the Union of the matter covering strikes and lockouts. I have always contended that if all parties interested in the labor question exhibited a desire to be fair that all difficulties could be adjusted and settled by arbitration.

"I have employed labor for thirty years, sometimes having as high as 500 men under my charge. I never have had a strike or a lockout—not only that, I have been on both sides of the question—for many years I labored for others; in those days, however, a strike was never thought of, the employer hired and discharged men to suit his own convenience and always paid just as little wages as possible. After becoming foreman for a large lumber company I have hired for them hundreds of men at from \$14 to \$20 per month and board and worked them from twelve to thirteen hours a day.

"Those days have passed, and labor and capital are getting closer together. Brute force is no longer the slogan. Foremen are not hired because they are pugilists. Labor is coming into its own. Capitalists have received a great jolt, and have come to the conclusion that it is better to feed and house men well and comfortably, and treat them as human beings. The only question is the wage. Capital and labor differ upon this question, and always will. We will always have great corporations and poverty, and right at this point is where arbitration will come in. All fair-minded men should be willing to leave their affairs, or rather disputes, to a competent body of disinterested men, and should be willing to abide by their decision.

"The disputants are not the only ones interested or injured by strikes and lockouts, but it carries to the great body of American citizens not directly interested in the disputes, and some means ought to be provided whereby both parties to a dispute should be held up until their grievances could be passed upon by an intelligent body of disinterested citizens, and sooner or later it must come to that. Do all you can to assist in passing an arbitration law that would have a tendency to give full justice to both capital and labor and the great body of onlookers. You can draw on me for any assistance that it is in my power to give."

Idaho Report Published

The eighteenth annual report on the mining industry of Idaho, which covers 1916, has been printed. It is from the pen of Robert M. Bell, the State Inspector of Mines.

DEDICATION OF BUREAU OF MINES PITTSBURGH BUILDING TO BE MADE NOTABLE OCCASION

Greatest Research Laboratory Under Control of Any Government Being Completed
at a Cost of \$1,000,000—Five Engineering Societies to Hold
Annual Meeting during Dedication

Largely through the efforts of the late lamented Dr. Joseph A. Holmes, the first director of the bureau, the Bureau of Mines has nearing completion in Pittsburgh a modern research laboratory involving a cost of about \$1,000,000. The buildings which constitute this complete plant will prove a graceful addition to the already notable group of buildings in that district. This plant will be, in its way, one of the greatest laboratories under Government control in any country in the world.

The name which the Bureau of Mines bears does not adequately express the far-reaching duties called for by the organic act creating it or the many ramifications of the mining and allied industries. Some people believe that the bureau deals only with the safety side of mining. It is perhaps true that the larger part of the work is devoted to mining and that our efforts toward saving human life in the mines of the country constitute its most spectacular work. This part of the work alone, Director Manning feels, justified the creation of the bureau, as each year sees a decrease in the number of miners killed and injured. The bureau is partly responsible for those conditions, and freely gives credit to the many cooperating agencies, such as the operators themselves, the State mine inspectors and the miners.

Entirely outside of the work in mining, the bureau is doing an important work, in which mechanical engineers are interested, in its study of fuels and the means whereby they can be more efficiently used. As long as fuels were very cheap and it was not necessary to seriously consider efficient practices, no very deep study of the subject of either fuels or combustion was needed, and cut-and-try methods were sufficient for commercial results; but with the need for increased economy and the conservation of rapidly disappearing types of fuel, together with the rapid introduction of special methods of utilizing fuels, such as by means of gas producers, surface combustion, powdered fuel, and liquid fuels in internal-combustion engines, the engineer requires a more careful explanation of the phenomena of combustion and a more intimate knowledge of the characteristics of available fuels. This work is being carried on in a systematic manner by the bureau, and the results already obtained show that it promises to be a study of important interest to all mechanical engineers and all users of fuel.

These investigations into this science of combustion are of value not only to mechanical engineers but to every user of fuel in the country, and especially to manufacturers who have large power plants and burn great amounts of coal in a year's time.

There is at present a renewed interest in the subject of heat transmission from the high temperature gases produced by combustion through metallic plates into fluids. Here again the art has needed a clearer conception of the mechanism of heat transfer and the constants and formulae that are necessary to put the design of heat transmitting devices on a rational basis. In this work the mechanical engineers of the country are greatly interested.

The work of the bureau is also of much interest to electrical engineers because the bureau is engaged in certain unusual electrical engineering researches in a field in which many electrical engineers are working, for which many more are making apparatus, and to which all electrical engineers could be helpful if they would study its needs. The last reason is, after all, the most forceful, for this is a day in which "service" is a word to conjure with. Electrical engineers should be interested in the bureau's work because the mining industry needs their ideas and their consideration of its electrical problems.

The bureau's researches are of a kind that a large proportion of electrical engineers have no time to undertake or equipment to carry on. The purpose of the researches is to aid and foster the development of better and safer electrical mine equipment, and this often leads to profitable activities on the part of the electrical engineer.

The manufacturers of electrical equipment are also interested in the electrical work of the bureau because the bureau can assist them in developing their apparatus along safe lines and because the bureau offers to issue formal approval with the bureau's specifications. Numerous manufacturers have materially improved the character of their apparatus by working in cooperation with the bureau, and at the present time the bureau has the cooperation of manufacturers of electric lamp bulbs, portable electric mine lamps, dry battery flash lamps, electric motors, storage batteries, electric wires and cables, electric switches, motors, headlights, storage battery locomotives and mining machines.

Electrical engineers of public service companies should be interested in the work of the

bureau because they are seeking to supply power for the operation of electrical mining machinery, and the bureau, in cooperation with the electrical engineers of coal companies, has prepared a set of rules that bear upon the installation and use of electrical equipment to which and through which the public service companies are seeking to supply power.

The petroleum investigations are large and important and of interest to all oil and gas men, pointing out, as they do, better methods for drilling oil wells, the stoppage of the waste of natural gas and oil, and even new processes for obtaining larger quantities of gasoline from the crude oil.

Every manufacturer of iron and steel in the country is interested in the work of the Bureau of Mines, also every metallurgist and every owner of a metal mine. The bureau has already made a careful investigation of the titaniferous iron ores of the United States, their composition and economic value. It has also issued a report on the manufacture and uses of alloy steels, a general statement on the composition and heat treatment of various steels, and their use for special purposes.

It has but recently completed an investigation of molybdenum, used as an alloy in hardening steel, and has shown how a profitable industry may be created in the United States through the development of American ores.

The bureau is also interested in the safety of the workmen in the iron and steel mills and

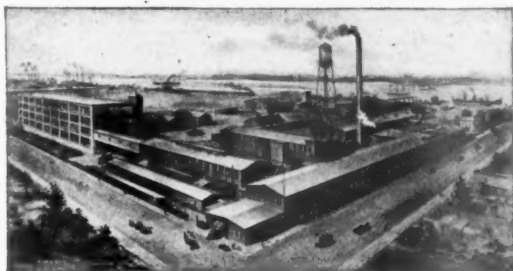
has issued reports on health conservation at steel mills, discussing the need of medical supervision of employes, the construction of buildings, and standards of sanitation, and on safe practice at blast furnaces, being a study of the causes of accidents and methods for their prevention. In this way the iron and steel interests have considerable to do with the Bureau of Mines.

The bureau's work aims to be of assistance to every municipality interested in the abatement of the smoke nuisance and the bureau has issued reports showing the proper manner in which to burn coal in order to avoid smoke and also the necessary legislative way in which to control this evil. It is needless to say that there is a large public interest in this work.

The bureau's activities also extend to the quarry interests of the country, the bureau having recently completed an investigation on the technology of marble quarrying which summarizes efficient and economical methods of quarrying and preparing marble and describes special and improved machinery and equipment. This is but one of a number of reports to be issued in behalf of the quarry industry.

The bureau's work also extends to the manufacturers of chinaware and ceramic engineers. In a report soon to be published by the bureau it will be shown that the practically unused china clays of Georgia can be blended in such a manner as to make this chinaware equal to

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that which comes from European countries. This may mean the independence of the United States of a foreign source of supply of china clay and the development of a considerable industry in this country.

Metallurgists and others interested in the development of the electric furnace are in close touch with the work of the bureau. A number of investigations along this line have already been completed and reports issued on electric furnaces for making iron and steel, the electrical furnace in metallurgical work, and the smelting of copper ores in the electric furnace.

These are but a few of the main activities of the Bureau of Mines, and show conclusively the large clientele of technical and engineering men and manufacturers who are directly interested in its work. Some part of the work of this bureau touches every technical and scientific man and every engineer in the country. Mr. Manning thus sketches this work briefly to show that upon the dedication of the new plant of the bureau at Pittsburgh there is occasion for a great gathering of manufacturers and technical and scientific men of the country. He points out that there are 25,000 men who are members of the five great engineering and chemical societies, such as the American Institute of Mining Engineers, the Mechanical Engineers, the Civil Engineers,

the Electrical Engineers and the American Chemical Society, and there are fully as many men connected with subsidiary societies, all representing the professional end of the industries, and holds therefore that there is a widespread interest in the work that the bureau intends to do in its new laboratories in Pittsburgh.

Since the beginning of the great European war there has been considerable amazement expressed at the technical and engineering efficiency of some of the nations and the lack of this in other nations. It has resulted in a great awakening in those countries that were behind in engineering; and the indications now are that each of these countries, at the close of the war, will begin a new era of scientific and engineering development, especially in its relation to the industries. This will mean a closer and a stronger competition with all of the European countries than ever known before. Mr. Manning says he is happy to state that the United States is not to be behind in this movement, as evidenced by the National Research Council recently formed in New York, which is to cooperate with the Federal Government in any endeavor in which industry can be benefited. This is also the purpose of the Bureau of Mines in its own sphere.

It has been Mr. Manning's thought that, at

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the dedication of the new buildings, October 5, 6 and 7, it will be opportune for a great national rally of the scientific and technical men of the country, emphasizing in every way the important place science has now attained in aiding the industries of the country. "It is a movement," he says, "which should be fostered very carefully, for some of the industries cling to the thumb-rule methods, which are wasteful and make competition difficult. We have already awakened to the fact that the cream of the natural resources of the country has been skimmed, and that we are now face to face with problems in which science will figure more and more if we are to be a prosperous and successful country in the future.

"The business men of Pittsburgh have a great opportunity before them to show the entire country, if not the entire world, that we are abreast of the movement to link science with the industries. My idea would be to have every society in any way in touch with the Bureau of Mines either hold its annual convention in Pittsburgh or be otherwise officially represented at the dedication of the new buildings, allowing the delegates to visit the various laboratories, the bureau keeping open house during the entire week. It is further planned that there shall be a national mine rescue and first-aid contest in which teams from mining companies throughout the country will participate."

In 1911, when the bureau was just finding itself, there was a similar demonstration in Pittsburgh, at which 20,000 miners were present. The bureau will take charge of this part of the dedication, and will see that the teams from the mining companies are here and will ask aid of the operators in excusing as many men as possible. There also will be demonstrations at the experimental mine of the bureau at Bruceton, Pa., in which miners would be shown the explosibility of coal dust without the presence of gas. This feature is generally accepted by the mining men of the country, but would prove a spectacular addition to the program, as there would be actual dust explosions at the mine.

Mr. Manning has no doubt that, altogether, this will be one of the greatest gatherings of men influential in the work of the country that Pittsburgh has ever entertained, and that the lessons will go out to the entire world as to what the United States is doing in mobilizing science in behalf of industry.

SENATOR JONES HONOR GUEST AT LUNCHEON

A luncheon was given by the Department of the Interior Lunch Club, March 7, to Senator A. A. Jones, of New Mexico, who resigned the office of First Assistant Secretary of the Interior last spring to accept a senatorial nomination from his State. The department mess room in the Bureau of

Mines Building was decorated with flags and flowers.

Secretary Lane paid an eloquent tribute to the breadth, power, sincerity and stalwart manhood of his former chief assistant, and sketched the great opportunity before him in the Senate during the next six years. No period of American history, he said, was so charged with virility, solemn duty and great opportunity as that which we are now entering. Even the period of nation-forming, following the Revolution, was not so pregnant with possibility as this era, in which, following upon fifty years of immense commercial activity, of strength-gathering, we are now emerging in full power into the world council of the nations. It is the time for men of courage and power and influence to step to the front.

Senator Jones, in a forceful speech, said that he regarded the Democratic victory in the State of New Mexico as a ratification by the people on the border of the President's Mexican policy. He stated that his connection with the Department of the Interior had given him strength everywhere during his campaign, and this he attributed to the sound accomplishments of the department during the present administration and their recognition by the people. He closed with an earnest plea to all Americans, in this juncture, to stand by the President.

Other speeches were made by George Otis Smith, director of the United States Geological Survey; Assistant Secretary of the Interior Bo Sweeney; Commissioner Cato Sells, of the Indian Office; Van H. Manning, director of the Bureau of Mines; Commissioner G. M. Saltzgaber, of the Bureau of Pensions, and First Assistant Secretary of the Interior Alexander T. Vogelsang.

Others present at the luncheon were: Charles D. Mahaffie, solicitor of the Interior Department; R. F. Whitehead, First Assistant Commissioner of Patents; E. B. Merritt, Assistant Commissioner of Indian Affairs; F. J. Bailey, chief clerk, Bureau of Mines; C. B. Gardner, solicitor's office, Interior Department; E. J. Ayers, chief clerk, Interior Department; F. W. H. Clay, Assistant Commissioner of Patents; J. K. Clement, physicist, Bureau of Mines; C. L. Parsons, chief chemist, Bureau of Mines; Morris Bien, counsel, Reclamation Service; F. M. Johnson, supervisor of surveys, General Land Office; J. J. Cotter, National Park Service; E. C. Tieman, Deputy Commissioner of Pensions; H. A. Meyer, private secretary to Secretary of the Interior; W. C. Edes, Alaskan Engineering Commissioner; R. S. Yard, National Park Service; G. S. Pope, engineer, Bureau of Mines; G. S. Rice, chief mining engineer, Bureau of Mines; C. J. Blanchard, statistician, Reclamation Service; J. T. Newton, examiner-in-chief, Patent Office; C. Naramore, petroleum technologist, Bureau of Mines, and M. W. Ball, law examiner, Bureau of Mines.

STUDY OF NICKEL AND**COBALT TO BE BEGUN**

Carl E. Julihn, of Alameda, California, has been appointed a mineral technologist in the service of the Bureau of Mines. He has been assigned to the Bureau of Mines station at Golden, Colorado. He will begin at once an extensive study of nickel and cobalt, with the idea of ascertaining the possibility of obtaining a domestic supply of these minerals. Mr. Julihn's salary will be \$3,600.

HOLMES SAFETY ASSOCIATION**HOLDS ANNUAL MEETING**

Before any awards will be made by the Joseph A. Holmes Safety Association at least \$100,000 must be in the treasury of the organization, it was decided at a meeting of the directors in Washington, March 6. Some of the directors are in favor of waiting until \$150,000 has been accumulated.

A constitution and by-laws were adopted and the name of the American Ceramic Society was added to the list of component organizations. L. R. Palmer, of the National Safety Council, addressed those present, during which he told of the growth of the safety movement. Van H. Manning, the director of the Bureau of Mines, reviewed the work which had been done by the association since its organization.

Working on Rock Dusting Device

A mechanical device for applying rock dust in mines is being developed by the Bureau of Mines. It is hoped that important improvements may be developed which can be used in connection with rock dusting machines.

Washington Map Selling Rapidly

A new map of the District of Columbia and its vicinity, which recently was placed on sale by the Geological Survey, is selling in unusual numbers. The issuance of this map is in line with the policy of the Survey to place at the disposal of the public splendidly executed and highly accurate maps which find use in many industrial activities and in addition are very valuable to motorists.

SUPERIOR TO LIENS

The New York statute (Laws of 1897, ch. 415, sec. 8) providing that upon the appointment of a receiver of a corporation other than moneyed corporations, the wages of the employees shall be preferred to every other debt or claim does not make the claims of laborers and employees preferred and does not require their payment out of the assets of the insolvent corporation as against a prior valid existing mortgage executed by the corporation before the claims for labor had accrued.

Schmidtman vs. Atlantic Phosphate & Oil Co., 230 Fed., 769, p. 770.

Personals

Victor Brandt, who is interested in potash recovery from brines in Nebraska lakes, has returned to Nebraska after an extended stay in Washington.

C. A. Herbert, of Cameron, Missouri, has been appointed a mine engineer in the service of the Bureau of Mines. He will have charge of the mine rescue car to be stationed at Raton, New Mexico. He is to report for duty April 1. His salary will be \$3,000.

Fred Green has been made state mine inspector of Kansas to succeed John Pellegrino, resigned.

G. W. Evans, of the Seattle Station of the Bureau of Mines, is visiting the coal mines of Washington. He hopes to be able to visit all the mines in that State, so as to have first-hand knowledge of conditions in each property.

Carl Scholz and Miss Mae A. Fleming were married in Chicago on Sunday, March 4, 1917. A wedding trip had been planned for southern California, but at the last minute was abandoned because of the pressure of important business matters.

THE MINING CONGRESS JOURNAL extends its best wishes.

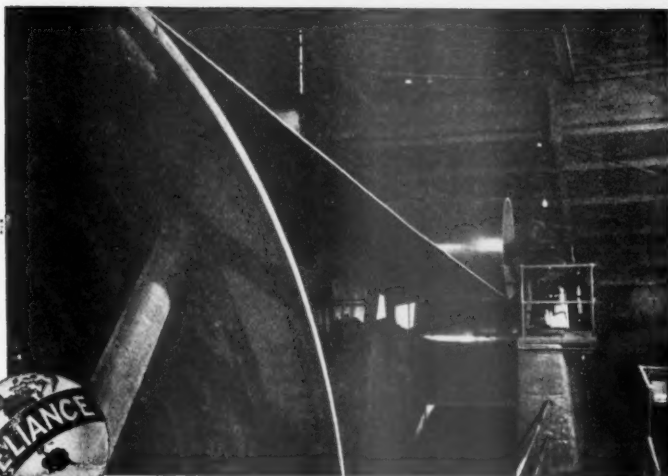
ANTHRACITE SHIPMENTS SHOW**DECREASE DURING FEBRUARY**

The shipments of anthracite in February, as reported to the Anthracite Bureau of Information, at Wilkes-Barre, amounted to 5,178,432 tons, as compared with 5,940,725 tons in January of this year and with 5,696,306 tons in February, 1916. The decrease as compared with January was 762,291 tons, and as compared with February, 1916, the decrease was 517,874 tons, the latter being due principally to the shortage of labor this year as compared with last, though about 225,000 tons of it was due to the fact that in 1916 there were twenty-five working days and in 1917 there were only twenty-four.

POTASH INVESTIGATION**BEGUN AT SALT LAKE CITY**

An investigation looking to the recovery of soluble potash salts from mineralized ores, tailings and other products of milling operations has been begun at the Salt Lake City experiment station of the Bureau of Mines.

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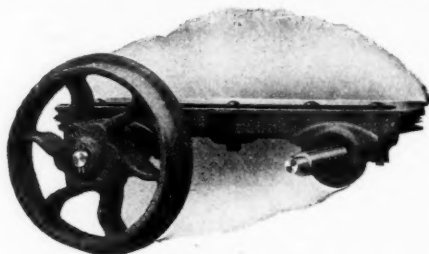
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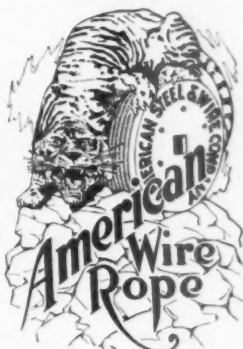
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**Bartlett & Snow Mfg. Co., C. O.,
Cleveland, Ohio**
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Vulcan Iron Works, Wilkes-Barre, Pa.
Wilmot Engineering Co., Hazleton, Pa.

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Link Belt Co., Chicago, Ill.
Malcolmson Briquet Engr. Co., Chi-
cago, Ill.
General Briquetting Co., 25 Broad
Street, New York City

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Ohio**
Electrical Material Co., 618 W.
Jackson Boulevard, Chicago, Ill.

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Broderick & Bascom Rope Co.,
St. Louis, Mo.
**Macomber & Whyte Rope Co.,
Kenosha, Wis.**
Flory Mfg. Co., S., Bangor, Pa.
Leschen & Son Rope Co., A., St. Louis,
Mo.
Jeffrey Mfg. Co., Columbus, Ohio
Electrical Material Co., Chicago, Ill.

CAGES

**Phillips Mine & Mill Supply Co.,
Pittsburgh, Pa.**
Ottumwa Iron Works, Ottumwa, Iowa
Eagle Iron Works, Des Moines, Iowa
Link Belt Co., Chicago
Mining Safety Device Co., Bowerston,
Ohio
**Herzer & Henninger Machine
Works, Belleville, Ill.**
**Holmes & Bros., Robt., Inc.,
Danville, Ill.**

CASTINGS

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Street, Columbus, Ohio**
**Imperial Brass Co., 537 S. Dear-
born St., Chicago, Ill.**

CAR DUMPS

**Phillips Mine & Mill Supply Co.,
Pittsburgh, Pa.**
Jeffrey Mfg. Co., Columbus, Ohio
Brown Hoisting Machinery Co., Cleve-
land, Ohio
Link Belt Co., Chicago, Ill.

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Duncan Foundry & Machine Works,
Alton, Ill.
Atlas Car & Mfg. Co., Cleveland, Ohio
Fairmont Mining Machinery Co.,
Fairmont, W. Va.
Lehigh Car Wheel & Axle Co., Cata-
sauqua, Pa.
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Lodell Car Wheel Co., Wilmington,
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Deister Concentrator Co., Fort Wayne, Ind.
Mine & Smelter Supply Co., Denver, Colo.
Colorado Iron Works Co., Denver, Colo.

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Jeffrey Mfg. Co., Columbus, Ohio
Stephens-Adamson Mfg. Co., Aurora, Ill.
Link Belt Co., Chicago, Ill.

CONVEYORS & ELEVATORS

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Link Belt Co., Chicago, Ill.
C. O. Bartlett & Snow & Co., Cleveland, Ohio.

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Chicago Pneumatic Tool Co., Chicago, Ill.
Ingersoll-Rand Co., 11 Broadway, New York City
Sullivan Machinery Co., Chicago, Ill.

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E. J. Longyear Co., Minneapolis, Minn.
Ameling Prospecting Co., H. R., St. Louis, Mo. (core drill contractors)

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Thorne, Neale & Co., Philadelphia, Pa.

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Ingersoll-Rand Co., 11 Broadway, New York City
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.
Worthington Pump & Machinery Corp., 115 Broadway, New York City.

CONTROLLERS

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Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

CONVEYORS, BELT

Jeffrey Mfg. Co., 958 N. Fourth Street, Columbus, Ohio
Link-Belt Co., Chicago, Ill.
Webster Mfg. Co., Tiffin, Ohio
Power & Mining Machinery Co., 115 Broadway, New York City
Robins Conveying Belt Co., New York
Stephens-Adamson Mfg. Co., Aurora, Ill.

CONVEYORS, CHAIN FLIGHT

Jeffrey Mfg. Co., 958 N. Fourth Street, Columbus, Ohio
Link-Belt Co., Chicago, Ill.
Webster Mfg. Co., Tiffin, Ohio
Wilnot Engineering Co., Hazleton Pa.

CONVEYORS, COAL

Fairmont Mining Machinery Co., Fairmont, W. Va.
Jeffrey Mfg. Co., 958 N. Fourth Street, Columbus, Ohio
Link-Belt Co., Chicago, Ill.

CONVEYORS, PAN OR APRON

Jeffrey Mfg. Co., 958 N. Fourth Street, Columbus, Ohio
Link-Belt Co., Chicago, Ill.
Webster Mfg. Co., Tiffin, Ohio

CONVEYORS, SCREW

Jeffrey Mfg. Co., 958 N. Fourth Street, Columbus, Ohio
Link-Belt Co., Chicago, Ill.
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Jeffrey Mfg. Co., 958 N. Fourth Street, Columbus, Ohio
Lehigh Car Wheel & Axle Works, Catasauqua, Pa.
Link-Belt Co., Chicago, Ill.
Pennsylvania Crusher Co., Philadelphia, Pa.
C. O. Bartlett & Snow & Co., Cleveland, Ohio.

CRUSHING PLANTS, COKE

Jeffrey Mfg. Co., 958 N. Fourth Street, Columbus, Ohio
Link-Belt Co., Chicago, Ill.
Webster Mfg. Co., Tiffin, Ohio
Williams Patent Crusher & Pulverizer Co., Old Colony Building, Chicago, Ill.

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Braun Corporation, The, Los Angeles, Cal.
Braun-Knecht-Heimann Co., San Francisco, Cal.
Buchanan Co., Inc., C. G., New York
Colorado Iron Works Co., Denver, Colo.
Denver Engineering Works Co., Denver, Colo.
Denver Fire Clay Co., Denver, Colo.
Hendrie & Bolthoff M. & S. Co., Denver, Colo.
Jeffrey Mfg. Co., The, 958 N. Fourth Street, Columbus, Ohio
Power & Mining Machinery Co., 115 Broadway, New York City
Smith Engineering Works, 3195 Locust Street, Milwaukee, Wis.
Sturtevant Mill Co., Boston, Mass.
Traylor Engineering & Mfg. Co., Allentown, Pa.
Webb City & Carterville Foundry & Machine Works, Webb City, Mo.
C. O. Bartlett & Snow & Co., Cleveland, Ohio.

CRANES

Brown Hoisting Machinery Co., Cleveland, Ohio
Jeffrey Mfg. Co., 958 N. Fourth Street, Columbus, Ohio
Link-Belt Co., Chicago, Ill.

CROSS-OVER DUMPS

Jeffrey Mfg. Co., 958 N. Fourth Street, Columbus, Ohio
Link-Belt Co., Chicago, Ill.
Phillips Mine & Mill Supply Co., Pittsburgh, Pa.

CUTTER HEADS

Frank Prox Co., Terre Haute, Ind.

CYANIDING

Koering Cyaniding Process Co., Detroit, Mich.

DERRICKS AND DERRICK FITTINGS

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Jeffrey Mfg. Co., 958 N. Fourth Street, Columbus, Ohio
Link-Belt Co., Chicago, Ill.

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The Hayward Co., New York
Jeffrey Mfg. Co., 958 N. Fourth Street, Columbus, Ohio
Link-Belt Co., Chicago, Ill.
McMyler Interstate Co., New York

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Longyear Co., E. J., Minneapolis, Minn.
Punxsutawney Drilling & Contracting Co., Punxsutawney, Pa.
Sullivan Machinery Co., Chicago, Ill.
Ameling, H. R., Prospecting Co., St. Louis, Mo.

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 Howells Mining Drill Co., Plymouth, Pa.
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 Cleveland Rock Drill Co., Cleveland, Ohio
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 Hardsoeg Wonder Drill Co., Ottumwa, Iowa
 Ingersoll-Rand Co., 11 Broadway, New York
 McKiernan-Terry Drill Co., 230 Broadway, New York
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 Cochise Machine Co., Los Angeles, Cal.
 Hardsoeg Wonder Drill Co., Ottumwa, Iowa
 Ingersoll-Rand Co., 11 Broadway, New York
Sullivan Machinery Co., Chicago, Ill.

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Sullivan Machinery Co., Chicago, Ill.

DRILLS, ROCK

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 Link-Belt Co., Chicago, Philadelphia
 Phillips Mine & Mill Supply Co., Pittsburgh, Pa.
 Sanford-Day Iron Works, Knoxville, Tenn.
Sullivan Machinery Co., Chicago, Ill.

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 Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

ELECTRICAL APPARATUS

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 Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

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Electric Service Supplies Co., Seventeenth and Cambria Streets, Philadelphia, Pa.
 General Electric Co., Schenectady, N. Y.
 Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.
 Electrical Material Co., Chicago, Ill.

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 Link-Belt Co., Chicago, Philadelphia
 Webster Mfg. Co., Tiffin, Ohio

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Stephens-Adamson Mfg. Co., Aurora, Ill.
 Webster Mfg. Co., Tiffin, Ohio
Jeffrey Mfg. Co., 958 N. Fourth Street, Columbus, Ohio

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 Chicago Pneumatic Tool Co., Chicago, Ill.

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 Ameling Prospecting Co., H. R., St. Louis, Mo.
 Hunt, Robt., & Co., Insurance Exchange, Chicago, Ill.
Jeffrey Mfg. Co., 958 N. Fourth Street, Columbus, Ohio
 Link-Belt Co., Chicago, Ill.

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Allis-Chalmers Mfg. Co., Milwaukee, Wis.
 Chicago Pneumatic Tool Co., Chicago, Ill.
 Hendrie & Bolthoff M. & S. Co., Denver, Colo.
 Ingersoll-Rand Co., 11 Broadway, New York
 National Transit Pump & Mach. Co., Oil City, Pa.
 Nordberg Mfg. Co., Milwaukee, Wis.

ENGINES, STEAM

Allis-Chalmers Mfg. Co., Milwaukee, Wis.

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 Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.
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Jeffrey Mfg. Co., 958 N. Fourth Street, Columbus, Ohio
 Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

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ELECTRIC RADIATORS

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Jeffrey Mfg. Co., 958 N. Fourth Street, Columbus, Ohio
 Link-Belt Co., Chicago, Ill.
 Ottumwa Box Car Loader Co., Ottumwa, Iowa
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Jeffrey Mfg. Co., 958 N. Fourth Street, Columbus, Ohio
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 Ottumwa Box Car Loader Co., Ottumwa, Iowa

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 Aetna Explosives Co., 2 Rector Street, New York City
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 Vulcan Iron Works, Wilkes-Barre, Pa.
 Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.
Duncan Foundry & Machine Works, Alton, Ill.

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 Webster Mfg. Co., Tiffin, Ohio
Jeffrey Mfg. Co., 958 N. Fourth Street, Columbus, Ohio

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Colorado Iron Works Co., Denver, Colo.
 Oliver Continuous Filter Co., San Francisco, Cal.
Koering Cyaniding Process Co., Detroit, Mich.

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Georgia Pine Turpentine Co., 160 Perry Street, New York City
 Pensacola Tar & Turpentine Co., Gulf Point, Fla.

FLOTATION, OIL

Colorado Iron Works Co., Denver, Colo.
 Oliver Continuous Filter Co., San Francisco, Cal.

FURNACES, ASSAY

Braun Corp., The, Los Angeles, Cal.
 Braun-knecht Heimann Co., San Francisco, Cal.
 Denver Fire Clay Co., Denver, Colo.
 Mine & Smelter Supply Co., Denver, Colo.

FURNACES, MECHANICAL ROASTING

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
 Dwight & Lloyd Sintering Co., Inc., New York City
 General Chemical Co., 25 Broad Street, New York, N. Y.
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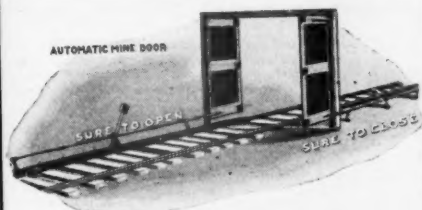
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Allis-Chalmers Mfg. Co., Milwaukee, Wis.

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Keystone Lubricating Co., Philadelphia, Pa.
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Sullivan Machinery Co., Chicago, Ill.

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Ohio Brass Co., Mansfield, Ohio

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Vulcan Iron Works, Wilkes-Barre, Pa.
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Denver Engineering Works Co., Denver, Colo.

Hendrie & Bolthoff M. & S. Co., Denver, Colo.

Lidgerwood Mfg. Co., 96 Liberty Street, New York

Nordberg Mfg. Co., Milwaukee, Wis.
Wellman Seaver Morgan Co., The, Cleveland, Ohio

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Hendrie & Bolthoff M. & S. Co., Denver, Colo.

Ingersoll-Rand Co., 11 Broadway, New York

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Lidgerwood Mfg. Co., 96 Liberty Street, New York

Nordberg Mfg. Co., Milwaukee, Wis.

Holmes, Robt., & Bros., Inc., Danville, Ill.

Ottumwa Iron Works, Ottumwa, Iowa
Sullivan Machinery Co., Chicago, Ill.

Vulcan Iron Works, Wilkes-Barre, Pa.
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Chas. A. Schieren Co., New York City

Wellman Seaver Morgan Co., The, Cleveland, Ohio

Litchfield Foundry & Machine Co., Litchfield, Ill.

HOSE, AIR

Cleveland Rock Drill Co., Cleveland, Ohio

Denver Rock Drill Mfg. Co., Denver, Colo.

Goodrich Co., The B. F., Akron, Ohio
Hardscog Wonder Drill Co., Ottumwa, Iowa

HOSE (Rubber)

Quaker City Rubber Co., Philadelphia, Pa.

HOISTING ROPES

Macomber & Whyte Rope Co., Kenosha, Wis.

HAULING ROPES

Macomber & Whyte Rope Co., Kenosha, Wis.

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Electrical Material Co., 618 W. Jackson Boulevard, Chicago, Ill.

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Ohio Brass Co., Mansfield, Ohio

Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

Electrical Material Co., 618 W. Jackson Boulevard, Chicago, Ill.

INSULATORS, SECTION

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Ohio Brass Co., Mansfield, Ohio

Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

Electrical Material Co., 618 W. Jackson Boulevard, Chicago, Ill.

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Jeffrey Mfg. Co., 958 N. Fourth Street, Columbus, Ohio

Link-Belt Co., Chicago, Philadelphia

Webster Mfg. Co., The, Tiffin, Ohio

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Justrite Mfg. Co., Chicago, Ill.

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Simmons Co., John, 34 Thirty-fifth Street, Brooklyn, N. Y.

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General Electric Co., Schenectady, N. Y.

Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

Electrical Material Co., 618 W. Jackson Boulevard, Chicago, Ill.

LAMPS, ELECTRIC

Edison Storage Battery Co., Orange, N. J.

General Electric Co., Schenectady, N. Y.

Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

LAMPS, SAFETY

Ackroyd & Best, Ltd., Pittsburgh, Pa.
American Safety Lamp & Mine Supply Co., Scranton, Pa.
Wolf Safety Lamp Co., New York City
Justrite Mfg. Co., Chicago, Ill.

LAMPS, SAFETY CAP

Edison Storage Battery Co., Orange, N. J.

LEATHER BELTING

Chicago Belting Co., Chicago, Ill.
Chas. A. Schieren Co., New York City, (Duxbak).

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Atlas Car & Mfg. Co., Cleveland, Ohio

Baldwin Locomotive Works, Philadelphia, Pa.

General Electric Co., Schenectady, N. Y.

Goodman Mfg. Co., Chicago, Ill.

Jeffrey Mfg. Co., 958 N. Fourth Street, Columbus, Ohio

Morgan-Gardner Electric Co., 68 E. Adams Street, Chicago, Ill.

Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

LOCOMOTIVES, GASOLINE

Vulcan Iron Works, Wilkes-Barre, Pa.

Whitcomb Co., Geo. D., Rochelle, Ill.

LOCOMOTIVES, RACK RAIL

Goodman Mfg. Co., Chicago, Ill.

LOCOMOTIVES, STEAM

American Locomotive Co., 30 Church Street, N. Y.

Baldwin Locomotive Works, Philadelphia, Pa.

Vulcan Iron Works, Wilkes-Barre, Pa.

LOCOMOTIVES, STORAGE BATTERY

Atlas Car & Mfg. Co., Cleveland, Ohio

Edison Storage Battery Co., Orange, N. J.

General Electric Co., Schenectady, N. Y.

Goodman Mfg. Co., Chicago, Ill.

Ironton Engine Co., Ironton, Ohio

Jeffrey Mfg. Co., 958 N. Fourth Street, Columbus, Ohio

Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

Whitcomb Co., Geo. D., Rochelle, Ill.

LUBRICANTS

Dixon Crucible Co., Joseph, Jersey City, N. J.

Keystone Lubricating Co., Philadelphia, Pa.

LUBRICATORS

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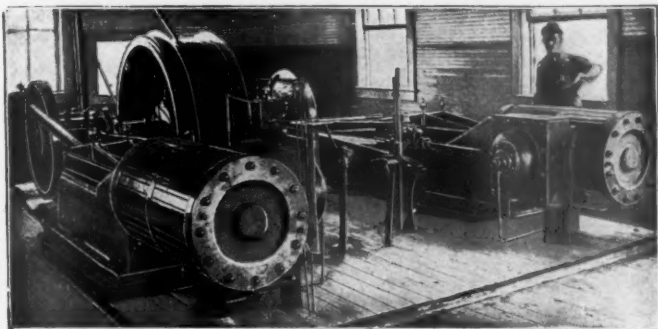
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